# NATIONAL Service Manual

ORDER NO. SD-225

ISO

# 72-WATT STEREO MUSIC CENTER WITH TWIN SPEAKER SYSTEMS

## MODEL SS-7000

## SPECIFICATIONS

### AMPLIFIER SECTION

| | |
|---|---|
| Peak Music Power Output: | 72 Watts at 8Ω (5%) |
| IHF Dynamic Power Output: | 36 Watts at 8Ω (5%)<br>30 Watts at 8Ω (1%) |
| Continuous Power Output: | 24 Watts at 8Ω (1%) |
| Power Bandwidth: | 10 Hz to 40,000 Hz (−3 dB) |
| Input Sensitivity (for rated output) | |
| PHONO 1 (Magnistate): | 150 mV |
| PHONO 2 (Moving Magnetic): | 3 mV |
| TAPE (REC): | 100 mV |
| (DIN): | 30 mV |
| Input Impedance | |
| PHONO 1 (Magnistate): | 30 kΩ |
| PHONO 2 (Moving Magnetic): | 50 kΩ |
| TAPE (REC): | 10 kΩ |
| (DIN): | 100 kΩ |
| Bass Range: | ±10 dB at 100 Hz |
| Treble Range: | ±10 dB at 10 kHz |
| Damping Factor: | 45 at 8 Ω |

### FM TUNER SECTION

| | |
|---|---|
| FM Usable Sensitivity (IHF): | 2.5μV |
| FM Harmonic Distortion: (at 400Hz, 100% modulation) | 0.5% |
| Signal to Noise Ratio: | 60 dB |
| FM Stereo Separation (at 1 kHz): | 35 dB |
| Capture Ratio (IHF): | 2.5 dB |

### AM TUNER SECTION

| | |
|---|---|
| AM Sensitivity (IHF): | 20μV |
| Dimension: (Including control knobs) | 18-5/32″(W) × 5-29/32″(H) × 13-25/32″(D) |
| Weight: | 17.6 lbs |
| Power Supply: | 110, 125, 210, 240V AC 65 Watts |

### RECORD PLAYER SECTION

| | |
|---|---|
| Turntable: | 11 inch stamped metal with beautiful rubber sheet |
| Cartridge: | MAGNISTATE (PCM ceramic) |
| Stylus: | PANASONIC EPS-13 TTSD (Diamond) |

### SPEAKER SYSTEM

| | |
|---|---|
| Power Handling Capacity: | 36 W (Peak) |
| Impedance: | 8Ω |
| Frequency Response: | 40 to 20,000 Hz |
| Crossover Frequencies: | 8,000 Hz |
| Bass Speaker (woofer) | |
| Diameter: | 6-1/2 inches |
| Resonance (Open Air): | 45 Hz |
| Treble Speaker (tweeter) | |
| Diameter: | 2 inches (horn) |
| Weight: | 11 pounds |
| Dimension: | 11-11/32″(W) × 18-9/16″(H) × 6-27/32″(D) |

<EXPORT DIVISION>
**MATSUSHITA ELECTRIC TRADING CO., LTD.**
**P.O. Box 288, Central Osaka, Japan**

**MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.**
**RIADO and STEREO DIVISION**

## COMBINATION OF SS-7000 STEREO SYSTEM

- **TUNER AMP ………………………………MODEL SA-700**
- **RECORD PLAYER ………………………MODEL SL-700**
- **SPEAKER SYSTEM……………………MODEL SB-150**

# DISASSEMBLY INSTRUCTIONS

## TO REMOVE RECORRD CHANGER

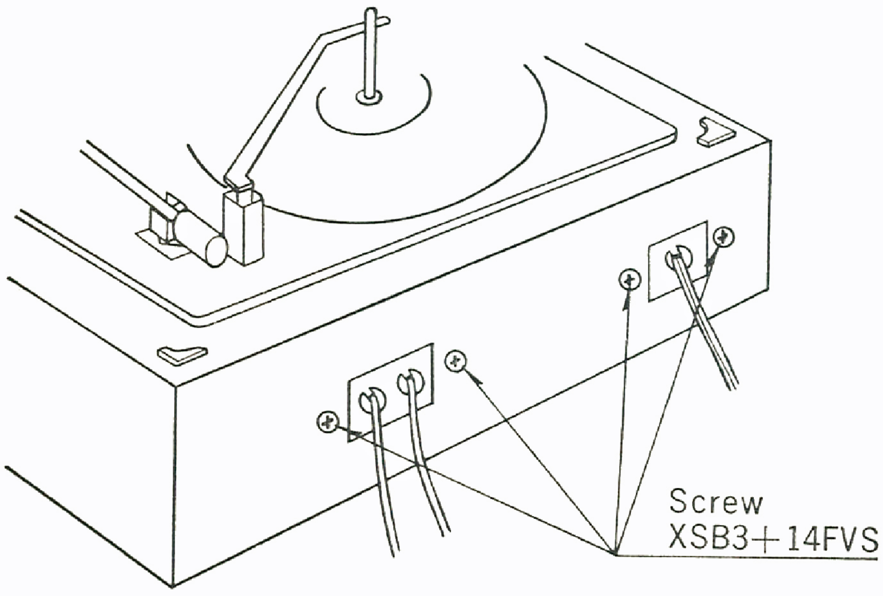

Screw
XSB3+14FVS

**Fig. 1 Back View (SL-700)**

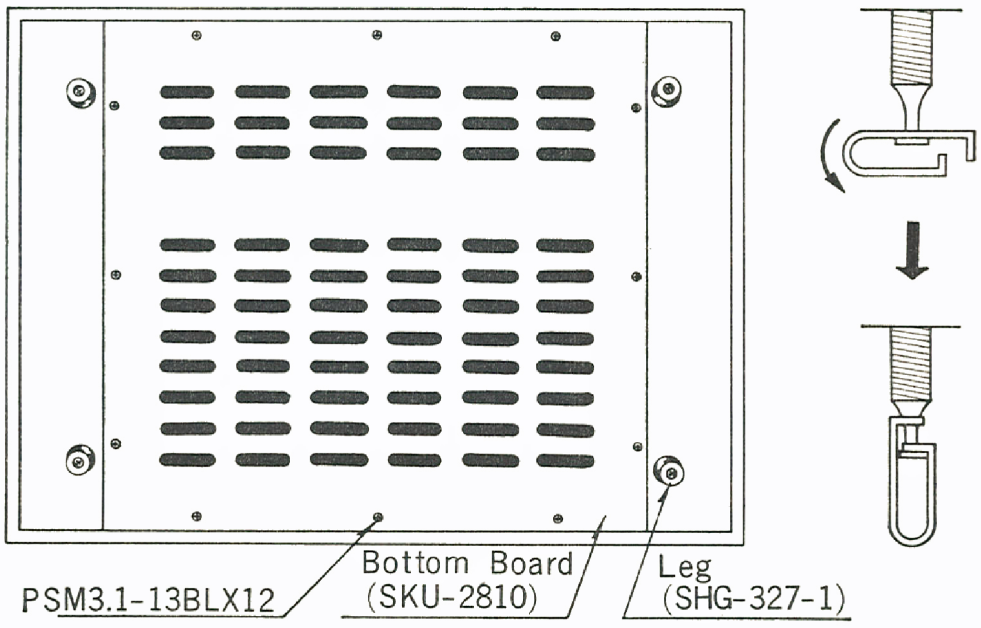

PSM3.1-13BLX12
Bottom Board
(SKU-2810)
Leg
(SHG-327-1)

**Fig. 2 Bottom Vier (SL-700)**

1) Remove four (4) screws, as illustrated in Fig. 1.
2) Remove twelve (12) bottom board screws, as illustrated in Fig. 2.
3) Turn three (3) locking clip, illustrated in Fig. 2.
4) Remove record changer from set.

## TO REMOVE CHASSIS

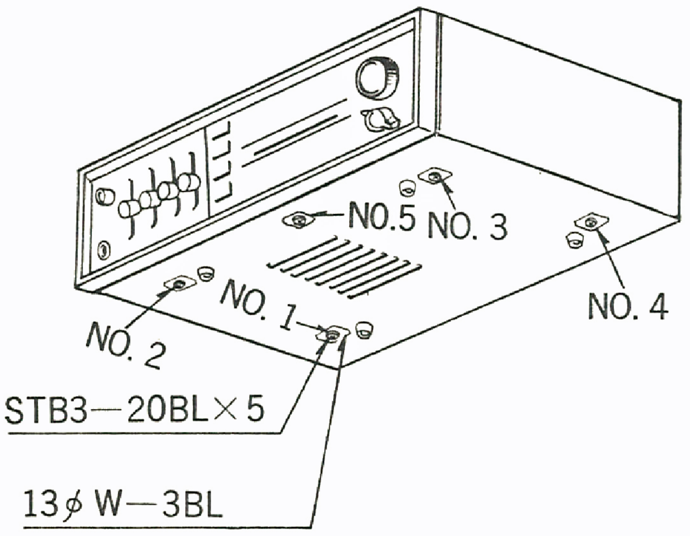

NO.5
NO. 3
NO. 1
NO. 2
NO. 4
STB3—20BL×5
13φ W—3BL

**Fig. 3**

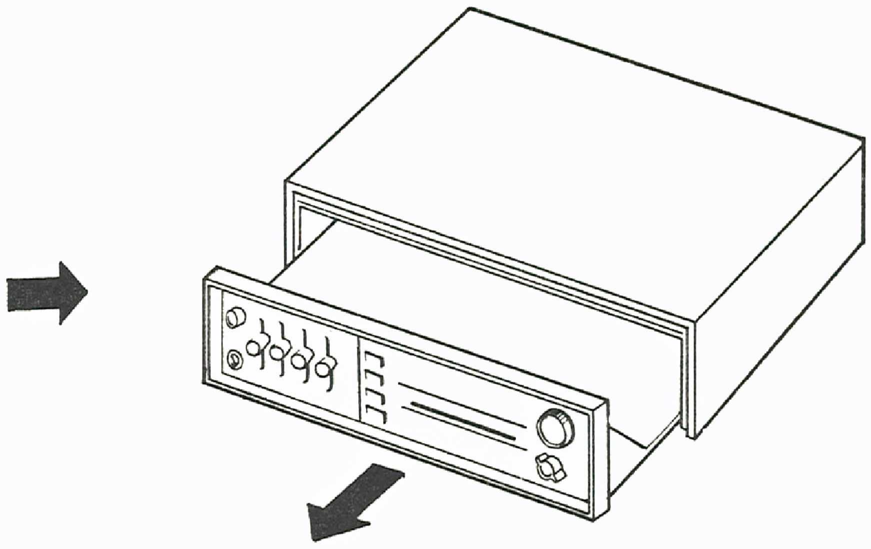
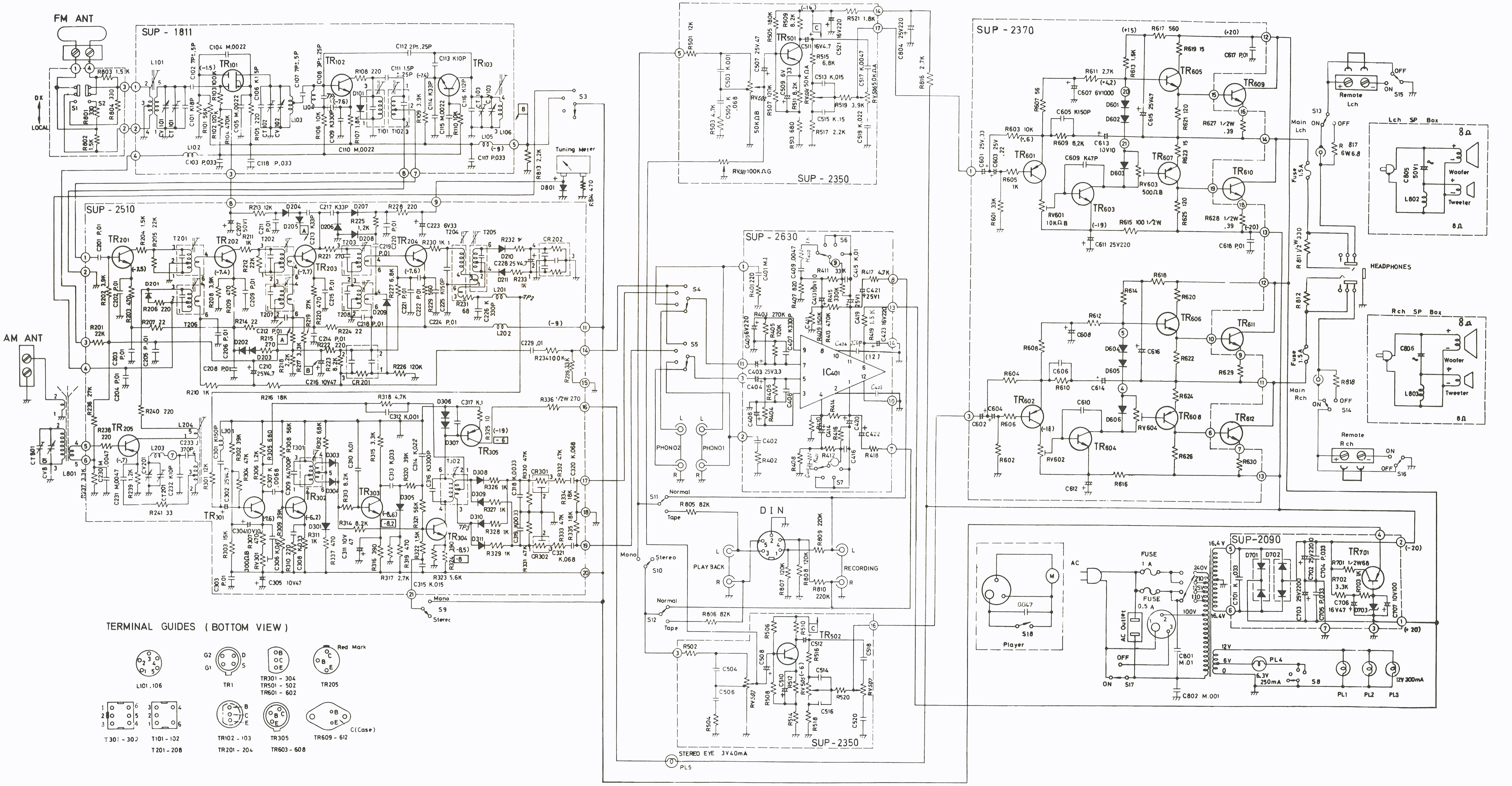


**Fig. 4**

Remove five (5) bottom board screws, Nos. 1-5, as illustrated in Fig. 3.
Remove chassis from cabinet, as illutrated in Fig. 4.

# SCHEMATIC DIAGRAM MODEL SS-7000


FM ANT
SUP - 1811
DX
LOCAL
S1
S2
TR101
TR102
TR103
Tuning Meter
SUP - 2510
TR201
TR202
TR203
TR204
TR205
AM ANT
TR301
TR302
TR303
TR304
TR305
SUP - 2350
TR501
TR502
SUP - 2630
IC401
S3
S4
S5
S6
S7
PHONO2
PHONO1
DIN
PLAY BACK
RECORDING
S9
S10
Mono
Stereo
S11
S12
Normal
Tape
STEREO EYE 3V40mA
PL5
SUP - 2370
TR601
TR602
TR603
TR604
TR605
TR606
TR607
TR608
TR609
TR610
TR611
TR612
Main Lch
Main Rch
S13
S14
Remote Lch
Remote Rch
S15
S16
Lch SP Box
Rch SP Box
Woofer
Tweeter
8Ω
HEADPHONES
SUP-2090
TR701
AC
FUSE
1 A
0.5 A
AC Outlet
S17
S18
Player
PL1
PL2
PL3
PL4
12V 300mA
TERMINAL GUIDES ( BOTTOM VIEW )
L101 . 106
TR1
TR301 - 304
TR501 - 502
TR601 - 602
TR205
Red Mark
T301 - 302
T101 - 102
T201 - 208
TR102 - 103
TR201 - 204
TR305
TR603 - 608
TR609 - 612
C(Case)

| TRANSISTORS | | DIODES | |
|---|---|---|---|
| TR$_{101}$ | 3SK32 | D$_{101}$ | OA79 |
| TR$_{102}$ | 2SC784 | D$_{201}$ | OA70 |
| TR$_{103}$ | 2SC381 | D$_{202-203}$ | MA26 |
| TR$_{201-202}$ | 2SC381 | D$_{204-207}$ | OA79 |
| TR$_{205}$ | 2SA102 | D$_{208-209}$ | OA70 |
| TR$_{301-304}$ | 2SC828 | D$_{210-211}$ | 2OA79 |
| TR$_{305}$ | 2SA550 | D$_{301}$ | MA26 |
| TR$_{501-502}$ | 2SA564 | D$_{303-304}$ | OA70 |
| TR$_{601-602}$ | A2SA564 | D$_{305-307}$ | MA26 |
| TR$_{603-606}$ | A2SC538 | D$_{308-311}$ | 2OA70 |
| TR$_{607-608}$ | A2SA550 | D$_{601-602.\ 604-605}$ | MA26 |
| TR$_{609-612}$ | A2SD226 | D$_{701}$ | IS1850 |
| TR$_{701}$ | 2SB324 | D$_{702}$ | IS1850R |
| TR$_{203.\ 204}$ | 2SC645 | D$_{703}$ | IS1717 |
| IC | | D$_{801}$ | OA70 |
| IC$_{401}$ | AN204 | D$_{603.\ 606}$ | DS410 |

NOTES

1. -○-···Corresponds to the number on the printed wiring board
2. S1-S2···FM Sensitivity Select Switch now in DX position.
3. S3-S8···Selector Switch now in PHONO2 position moves
   PHONO2→ PHONO1→ FMAUTO→ AM in that order.
4. S9-S10···MODE Switch now in STEREO position.
5. S11-S12···TAPE MONITOR Switch now in normal position.
6. S13-S14···MAIN SPEAKER Switch now in ON position.
7. S15-S16···REMOTE SPEAKER Switch now in OFF position.
8. DC Voltage measurements are taken with circuit
   Tester (100KΩ/V) from chassis ground.
   (          )········NO Signal Condition.
   ☐········FM Stereo Signal Reception.
9. S17 Power Scurce Switch now in ON position.

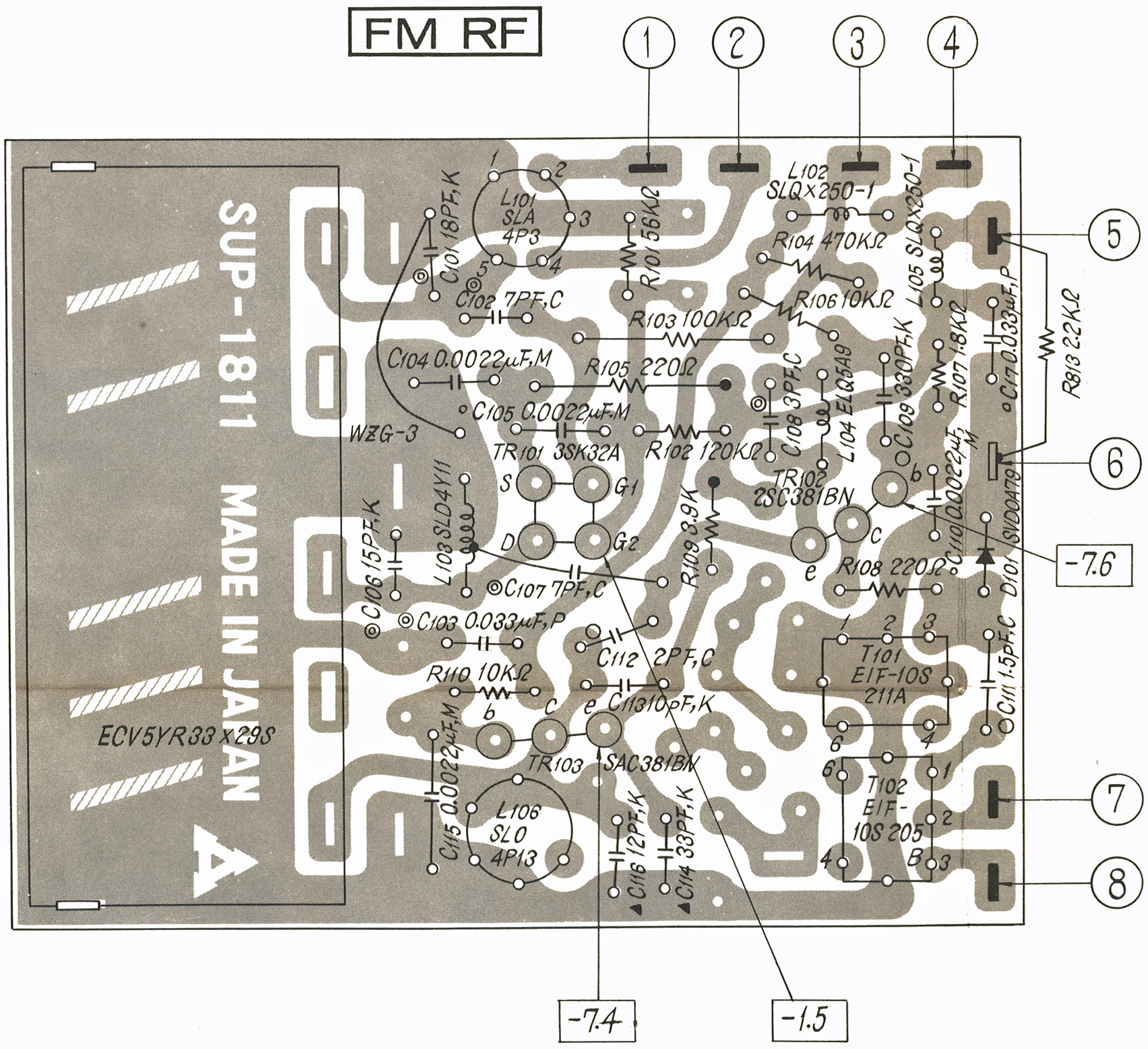
| CR Numbers | | |
|---|---|---|
| FM FRONT | C101~118 | R101~110 |
| IF | C201~233 | R201~241 |
| MPX | C301~321 | R301~337 |
| PRE | C401~423 | R401~419 |
| AF | C503~521 | R501~521 |
| POWER | C601~618 | R601~630 |
| POWER SOURCE | | |
| | C701~707 | R701~703 |
| OTHERS | C801~807 | R801~818 |

**NATIONAL** STEREO RADIO PHONO

# CIRCUIT BOARD

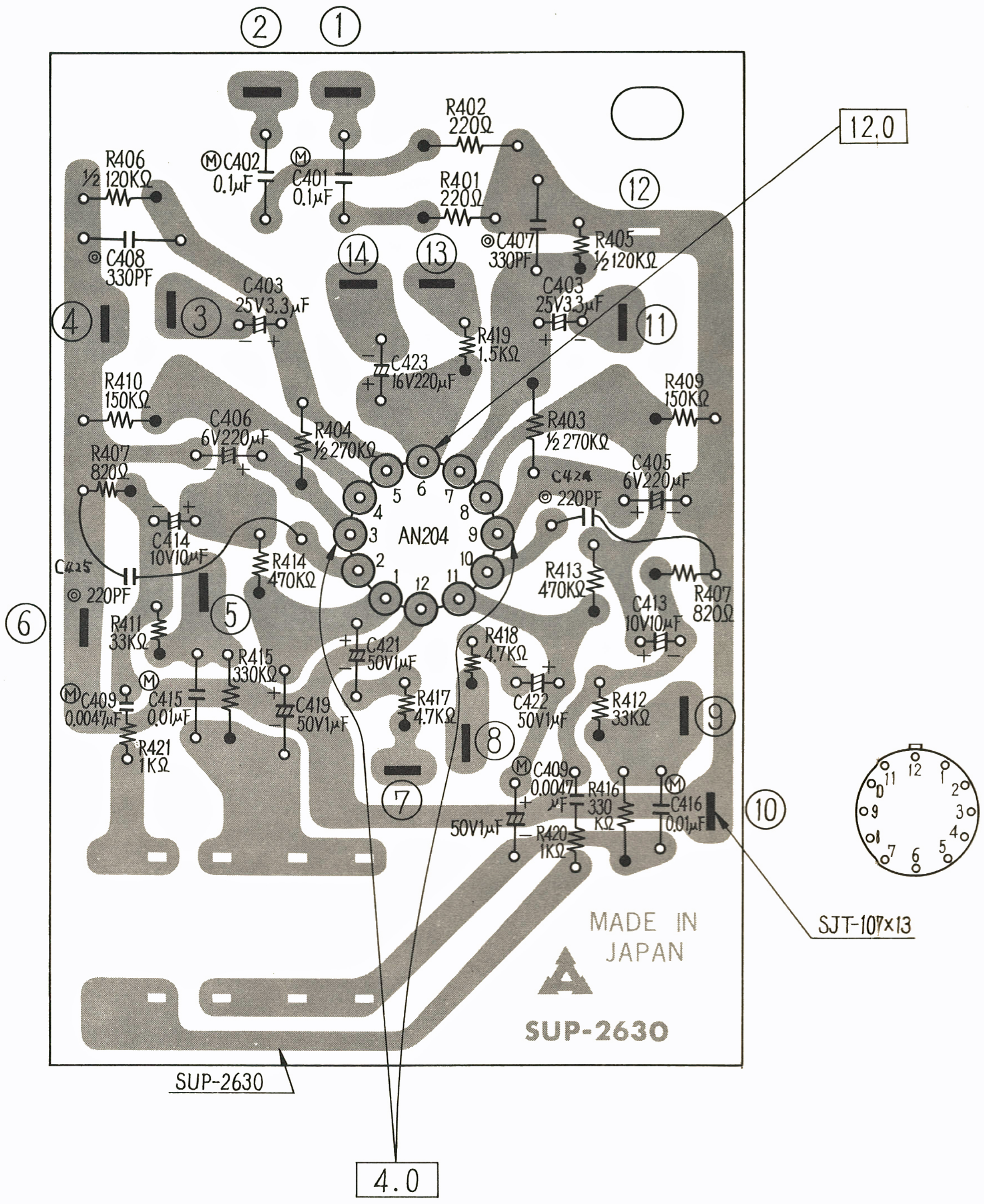
## MODEL SS-7000

### FM RF



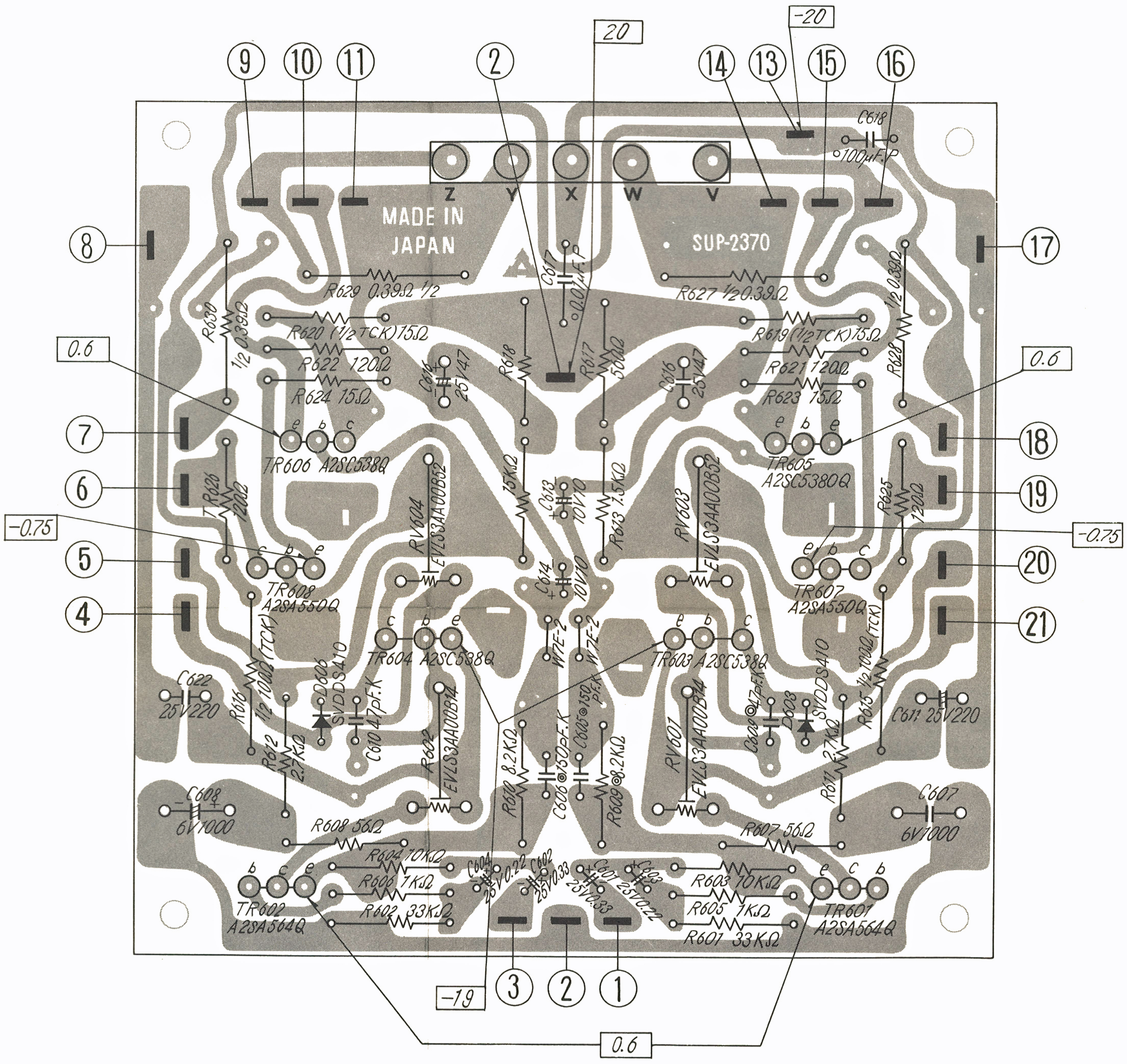
①
②
③
④
⑤
⑥
⑦
⑧
SUP-1811
MADE IN JAPAN
ECV5YR33 x29S
WZG-3
L101 SLA 4P3
C101 18PF,K
C102 7PF,C
R101 56KΩ
L102 SLQx250-1
R104 470KΩ
R106 10KΩ
R103 100KΩ
L105 SLQx250-1
C104 0.0022μF,M
R105 220Ω
C105 0.0022μF,M
TR101 3SK32A
R102 120KΩ
C108 3PF,C
L104 ELQ5A9
C109 330PF,K
R107 1.8KΩ
C117 0.033μF,P
R813 22KΩ
TR102 2SC381BN
C110 0.0022μF,M
SVD0A79
D101
L103 SLD4Y11
C106 15PF,K
C107 7PF,C
C103 0.033μF,P
R109 3.9K
R108 220Ω
T101 EIF-10S 211A
C111 1.5pF,C
C112 2PF,C
R110 10KΩ
C113 10pF,K
TR103 SAC381BN
C115 0.0022μF,M
L106 SLO 4P13
C116 12PF,K
C114 33PF,K
T102 EIF-10S 205
-7.6
-7.4
-1.5

### EQUALIZER



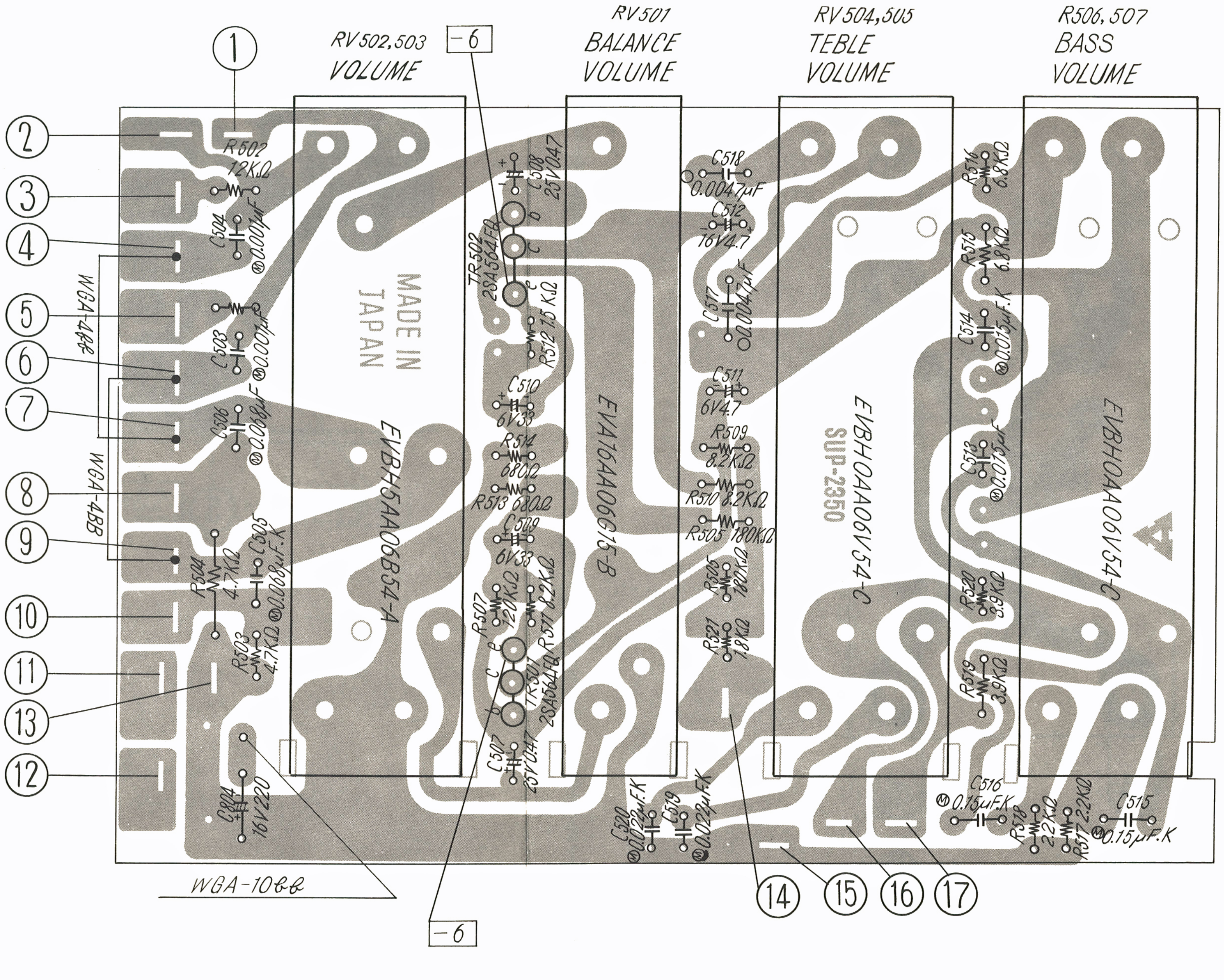
②
①
R402 220Ω
C402 0.1μF
C401 0.1μF
R401 220Ω
R406 ½ 120KΩ
C408 330PF
C407 330PF
R405 ½ 120KΩ
⑫
12.0
⑭
⑬
④
③
C403 25V3.3μF
C403 25V3.3μF
⑪
C423 16V220μF
R419 1.5KΩ
R410 150KΩ
R409 150KΩ
C406 6V220μF
R404 ½ 270KΩ
R403 ½ 270KΩ
R407 820Ω
C424 220PF
C405 6V220μF
C414 10V10μF
AN204
R414 470KΩ
R413 470KΩ
C425 220PF
⑥
⑤
R411 33KΩ
R407 820Ω
C413 10V10μF
R415 330KΩ
C421 50V1μF
R418 4.7KΩ
C409 0.0047μF
C415 0.01μF
C419 50V1μF
R417 4.7KΩ
C422 50V1μF
R412 33KΩ
⑨
⑧
R421 1KΩ
⑦
C409 0.0047μF
R416 330 KΩ
C416 0.01μF
⑩
50V1μF
R420 1KΩ
SJT-107x13
MADE IN JAPAN
SUP-2630
SUP-2630
4.0
1 2 3 4 5 6 7 8 9 10 11 12

## POWER



20
-20
⑨ ⑩ ⑪ ② ⑭ ⑬ ⑮ ⑯
Z Y X W V
C618 100μF.P
MADE IN JAPAN
SUP-2370
⑧ ⑰
R629 0.39Ω 1/2
R627 1/2 0.39Ω
C617 0.01μF.P
R630 1/2 0.39Ω
R628 1/2 0.39Ω
R620 (1/2 TCK) 15Ω
R619 (1/2 TCK) 15Ω
R622 120Ω
R621 120Ω
R624 15Ω
R623 15Ω
C614 25V47
C616 25V47
R618
R617 500Ω
0.6
⑦ ⑱
TR606 A2SC538Q
TR605 A2SC5380Q
⑥ ⑲
R626 220Ω
R625 120Ω
-0.75
⑤ ⑳
TR608 A2SA550Q
TR607 A2SA550Q
④ ㉑
RV604 EVL53AA00B52
RV603 EVLS3AA00B52
R614 15KΩ
R613 1.5KΩ
C613 10V10
C614 10V10
W7F-2
TR604 A2SC538Q
TR603 A2SC538Q
C622 25V220
C611 25V220
R616 1/2 100Ω (TCK)
R615 1/2 100Ω (TCK)
D602 SVDDS410
D601 SVDDS410
C610 47pF.K
C609 47pF.K
R612 2.7KΩ
R611 2.7KΩ
RV602 EVLS3AA00B14
RV601 EVLS3AA00B14
R610 8.2KΩ
R609 8.2KΩ
C606 150pF.K
C605 150pF.K
C608 6V1000
C607 6V1000
R608 56Ω
R607 56Ω
R604 10KΩ
R603 10KΩ
R606 1KΩ
R605 1KΩ
R602 33KΩ
R601 33KΩ
C604 25V0.22
C602 25V0.33
C601 25V0.33
C603 25V0.22
TR602 A2SA564Q
TR601 A2SA564Q
-19
③ ② ①
0.6

## TONE CONTROL AMP



RV502,503 VOLUME
RV501 BALANCE VOLUME
RV504,505 TEBLE VOLUME
R506,507 BASS VOLUME
-6
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑬ ⑫
R502 12KΩ
C504 0.001μF
WGA-4BB
C503 0.001μF
C506 0.068μF
C505 0.068μF.K
R504 4.7KΩ
R503 4.7KΩ
C804 16V220
WGA-10BB
MADE IN JAPAN
EVBH5AA06B54-A
TR502 2SA564A-FR
C508 25V0.47
R512 15KΩ
C510 6V33
R514 680Ω
R513 680Ω
C509 6V33
R507 120KΩ
R511 2.2KΩ
TR501 2SA564A-FR
C507 25V0.47
EVA16AA06615-B
C518 0.0047μF
C512 16V4.7
C517 0.0047μF
C511 6V47
R509 8.2KΩ
R510 8.2KΩ
R505 180KΩ
R506 180KΩ
R521 1.8KΩ
C520 0.022μF.K
C519 0.022μF.K
SUP-2350
EVBH0AA06V54-C
R516 6.8KΩ
R515 6.8KΩ
C514 0.0015μF.K
C513 0.015μF
R520 3.9KΩ
R519 3.9KΩ
C516 0.15μF.K
R518 22KΩ
R517 22KΩ
C515 0.15μF.K
⑭ ⑮ ⑯ ⑰
-6

# CABINET : LOCATION OF PARTS

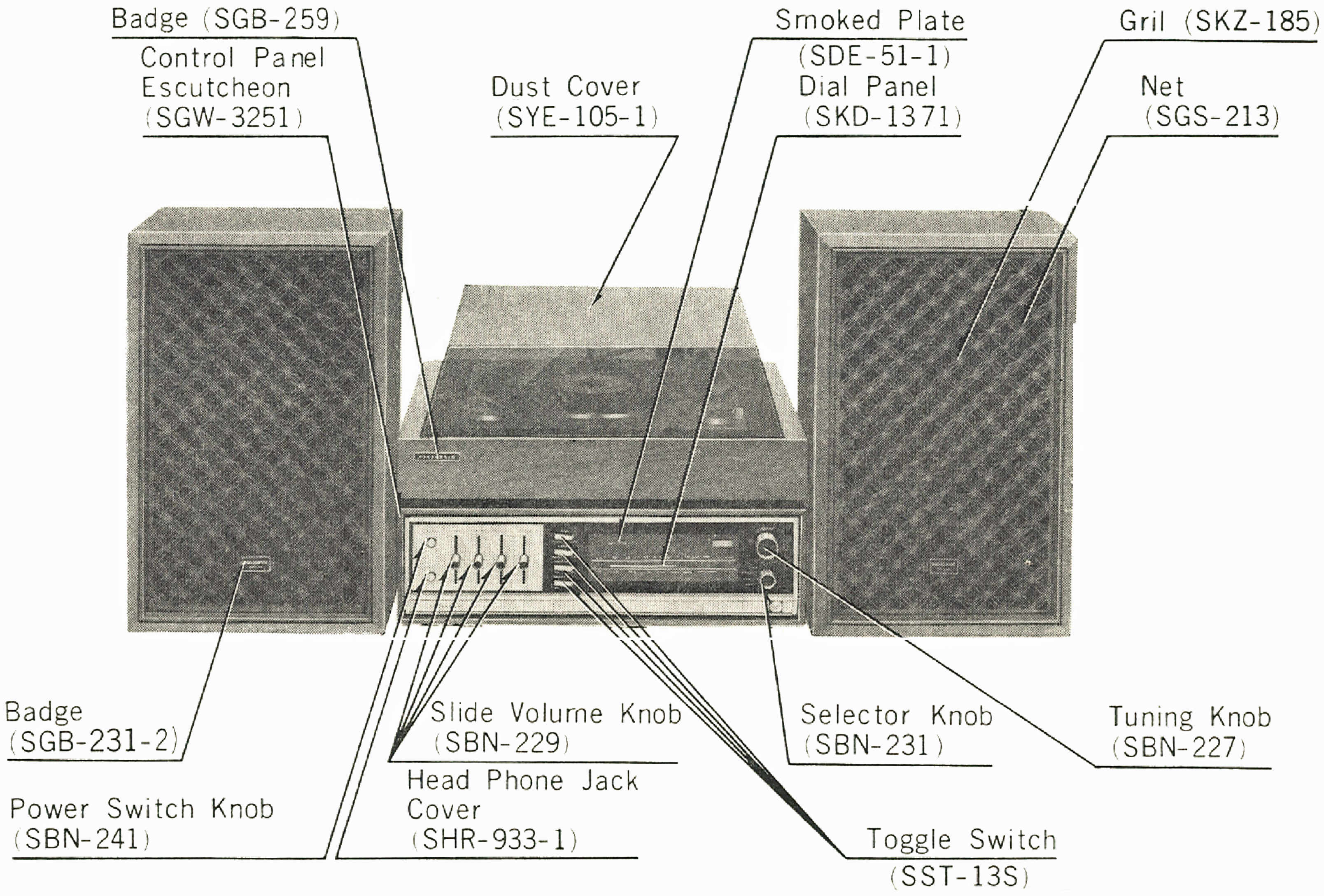
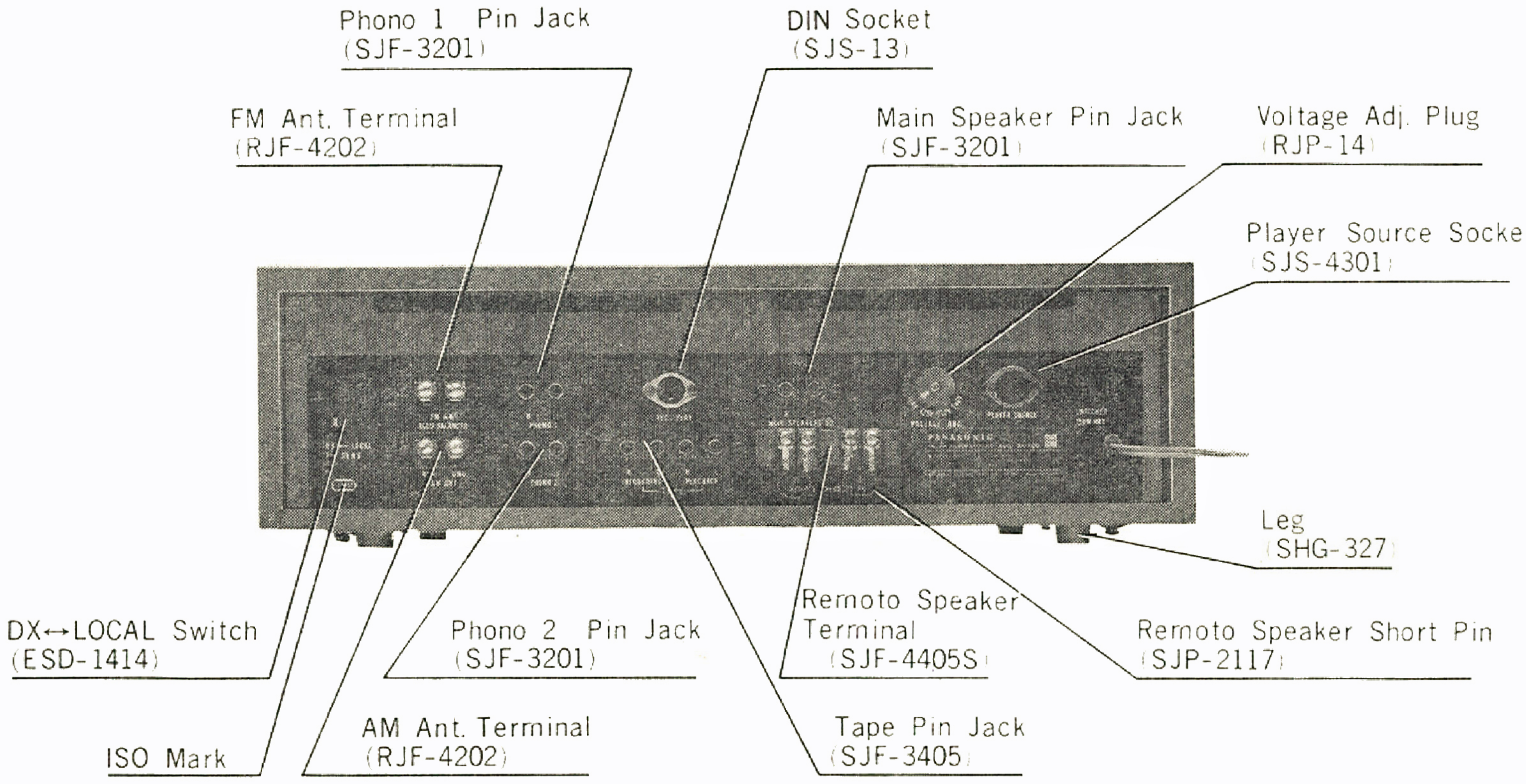

Badge (SGB-259)
Control Panel Escutcheon (SGW-3251)
Dust Cover (SYE-105-1)
Smoked Plate (SDE-51-1)
Dial Panel (SKD-1371)
Gril (SKZ-185)
Net (SGS-213)
Badge (SGB-231-2)
Power Switch Knob (SBN-241)
Slide Volume Knob (SBN-229)
Head Phone Jack Cover (SHR-933-1)
Selector Knob (SBN-231)
Tuning Knob (SBN-227)
Toggle Switch (SST-13S)

Fig. 5 Front View


Phono 1 Pin Jack (SJF-3201)
DIN Socket (SJS-13)
FM Ant. Terminal (RJF-4202)
Main Speaker Pin Jack (SJF-3201)
Voltage Adj. Plug (RJP-14)
Player Source Socket (SJS-4301)
Leg (SHG-327)
DX↔LOCAL Switch (ESD-1414)
Phono 2 Pin Jack (SJF-3201)
Remoto Speaker Terminal (SJF-4405S)
Remoto Speaker Short Pin (SJP-2117)
ISO Mark
AM Ant. Terminal (RJF-4202)
Tape Pin Jack (SJF-3405)

※ ○ Phono 1···Ceramic Cartridge
○ Phono 2···Magnetic Cartridge

Fig. 6 Back View, MODEL SA-700

# DIAL CORD STRINGING GUIDE

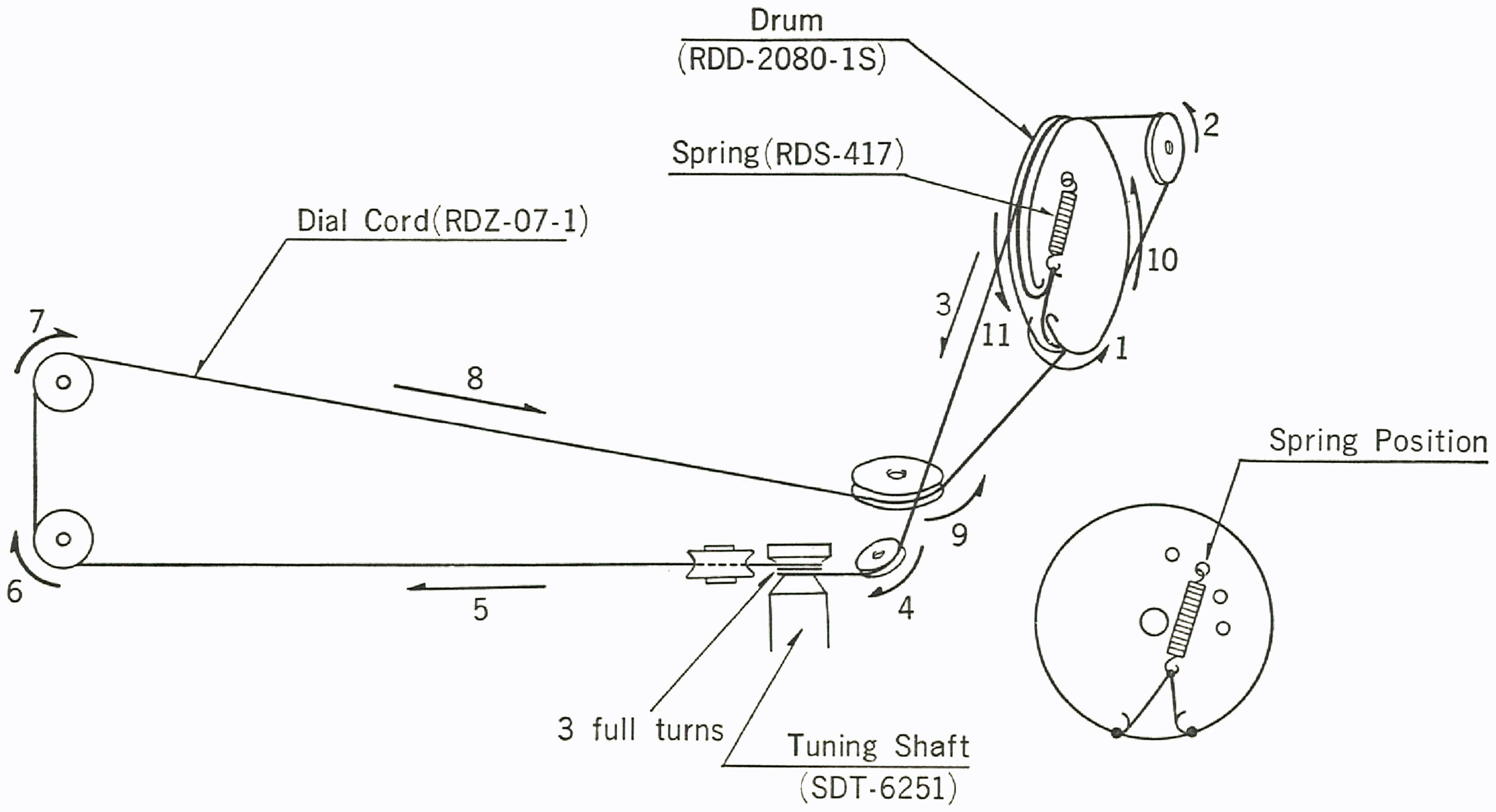

Drum
(RDD-2080-1S)
Spring(RDS-417)
Dial Cord(RDZ-07-1)
1
2
3
4
5
6
7
8
9
10
11
Spring Position
3 full turns
Tuning Shaft
(SDT-6251)

Fig. 7

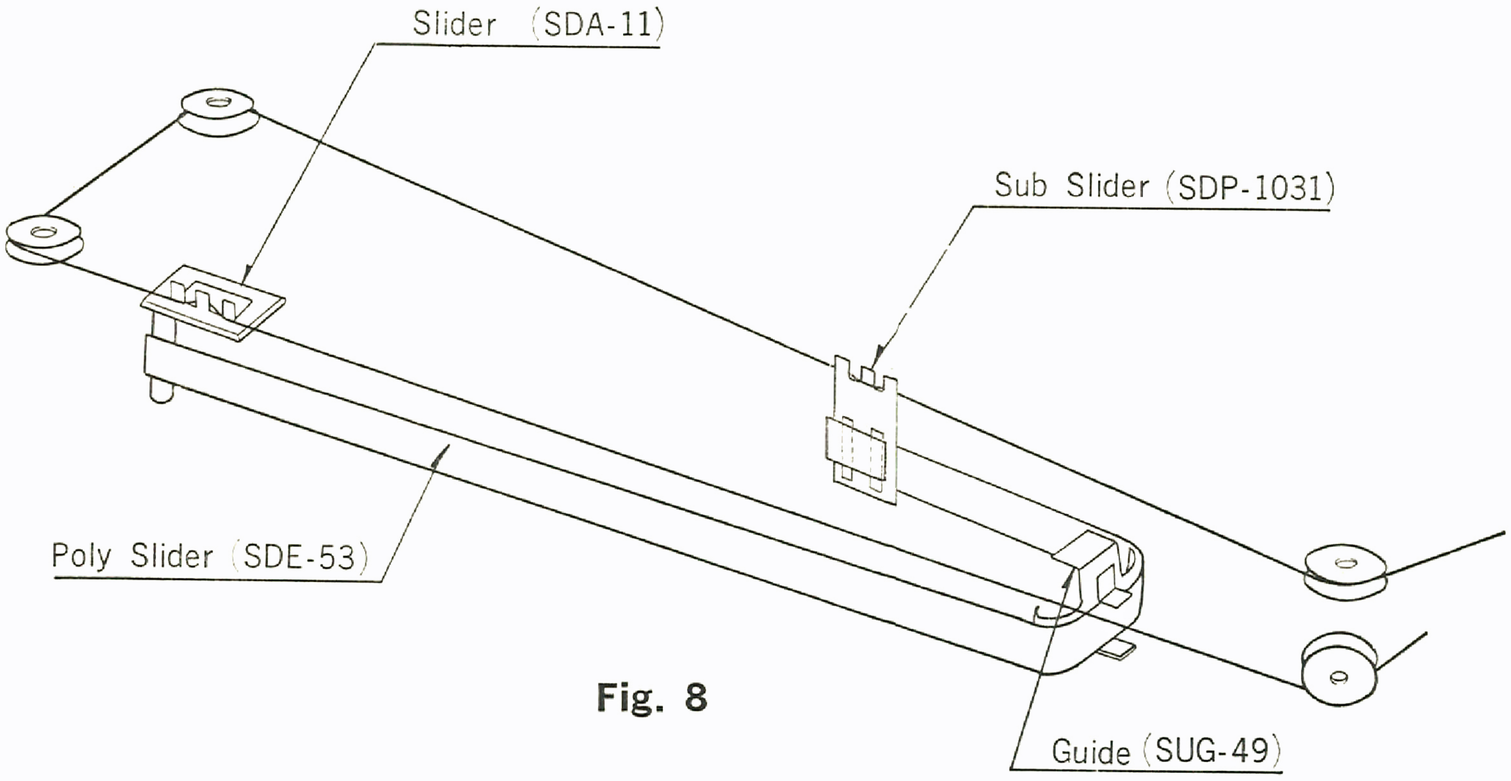

Slider (SDA-11)
Sub Slider (SDP-1031)
Poly Slider (SDE-53)
Guide (SUG-49)

Fig. 8

**Notes:**

1. Dial cord lengh is 60″.
2. Tuning gang is positioned at minimum capacity.
3. Arrow marks (1–11) indicate correct oder and dirction of stringing dial cord.
4. Cement dial cord ends.

**To Mount Slider**

1. Set tuning gang to fully closed position.
2. Set slider to start poiut of dial scale.
3. Attach slider to dial cord.
4. Attach sub slider to dial cord.

# SPEAKER CONNECTION

## MODEL SB-150

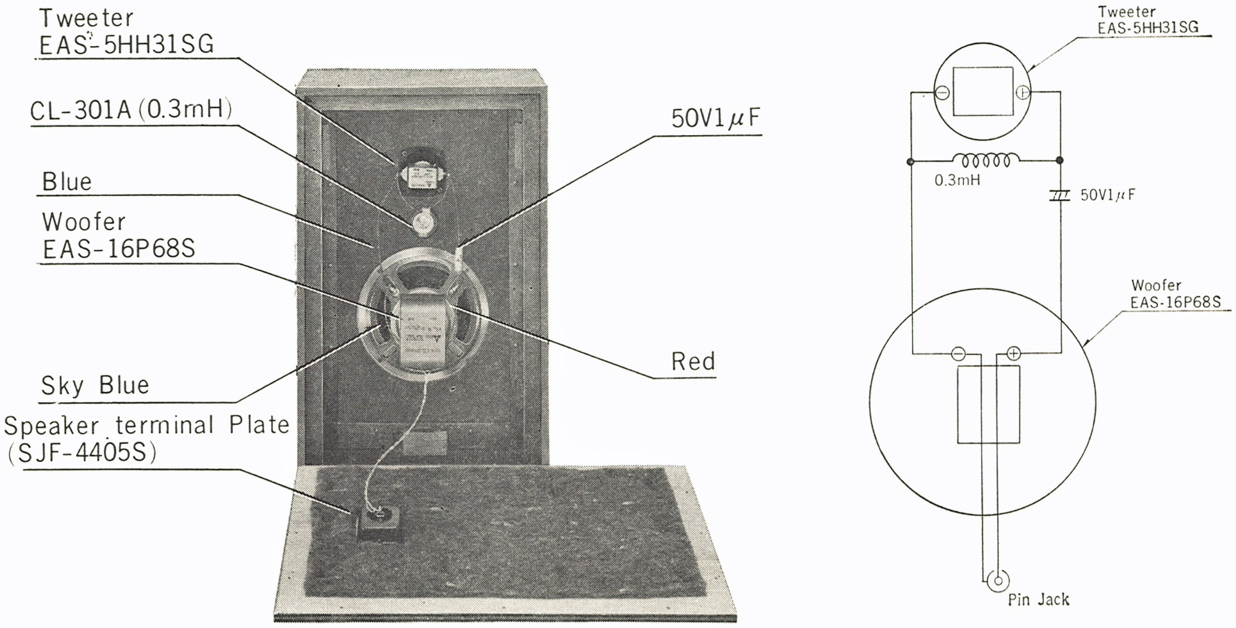

Tweeter
EAS-5HH31SG
CL-301A (0.3mH)
Blue
Woofer
EAS-16P68S
Sky Blue
Speaker terminal Plate
(SJF-4405S)
50V1μF
Red
Tweeter
EAS-5HH31SG
0.3mH
50V1μF
Woofer
EAS-16P68S
Pin Jack

Fig. 9

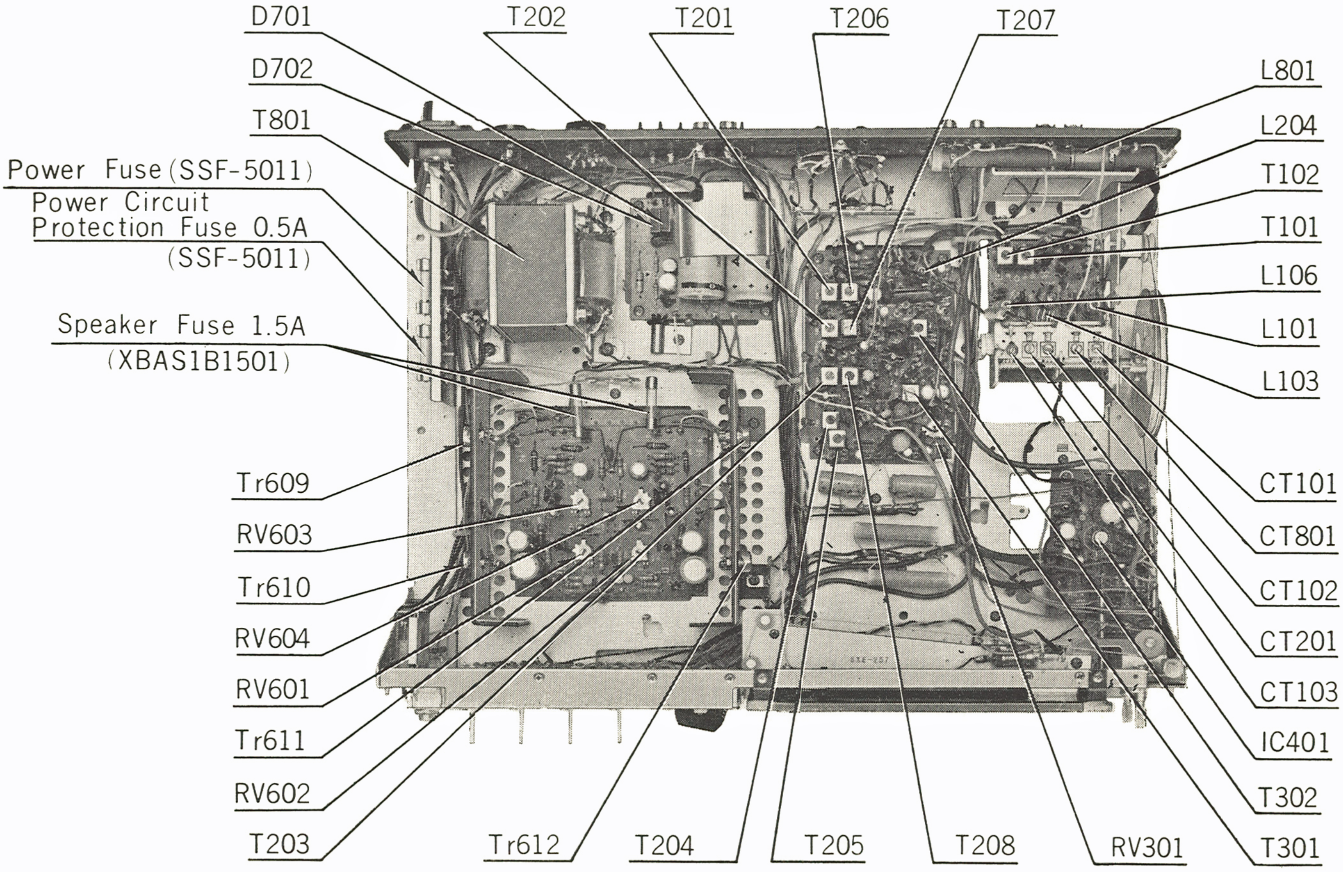

D701
D702
T801
Power Fuse (SSF-5011)
Power Circuit
Protection Fuse 0.5A
(SSF-5011)
Speaker Fuse 1.5A
(XBAS1B1501)
Tr609
RV603
Tr610
RV604
RV601
Tr611
RV602
T203
T202
T201
T206
T207
L801
L204
T102
T101
L106
L101
L103
CT101
CT801
CT102
CT201
CT103
IC401
T302
T301
Tr612
T204
T205
T208
RV301

Fig. 10

# ALIGNMENT INSTRUCTIONS

## FREQUENCY & DISTANCE OF DIAL SCALE

To accurately align the proper frequencies to the dial scale, refer to the table and mark the edge of the dial scale plate accordingly, using the "Start Point" mark on the dial scale as reference point.

**TABLE**

| Band | Frequency | Distance from "Start Point" | |
|---|---|---|---|
| AM | 550 kHz | 11.34 mm | $\frac{15}{32}''$ |
| | 1500 kHz | 109.62 mm | $4\frac{5}{16}''$ |
| FM | 90 MHz | 20.2 mm | $\frac{25}{32}''$ |
| | 106 MHz | 69.1 mm | $2\frac{23}{32}''$ |

## 1. AM/FM-IF & RF ALIGNMENT

### ■ AM-IF & RF ALIGNMENT

**EQUIPMENT REQUIRED**

Signal generator that provides 455 kHz-1700 kHz AM (30% modulated with 400 Hz)

Radiation loop coil

Output meter (Circuit tester or VTVM)

Monitor speaker

Output of signal generator should be no higher than necessary to obtain an output reading.

- ∗ Set volume control to maximum.
- ∗ Set balance control to center.
- ∗ Set bass control to center.
- ∗ Set treble control to center.
- ∗ Set band selector switch to AM.

| STEP | SIGNAL GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | INDICATOR | ADJUST | REMARKS |
|---|---|---|---|---|---|---|
| 1 | Fashion loop of several turns of wire and radiate signal into loop of receiver. | 455 kHz (400 Hz Mod.) | Point of non-interference. (on about 600 kHz) | Output meter across EXT Speaker Terminal (L) | T206 (IFT)<br>T207 (IFT)<br>T208 (IFT) | Adjust for maximum output. |
| 2 | | 550 kHz (400 Hz Mod.) | 550 kHz | | L204 (OSC Coil)<br>L801 (ANT Coil) | Adjust for maximum output by sliding coil (L801) along ferrite core. |
| 3 | | 1500 kHz (400 Hz Mod.) | 1500 kHz | | Ct201 (OSC Trimmer)<br>Ct801 (ANT Trimmer) | Adjust for maximum output.<br>Repeat steps (2) and (3). |

**Notes:** 1. Cement antenna bobbin with wax after completing alignment.
2. Make certain that speaker system is connected to the tuner when aligning.

## ■ FM IF AND DETECTOR ALIGNMENT WITH OSCILLOSCOPE

### EQUIPMENT REQUIRED

Signal generator that provides 10.7 MHz marker.
Sweep generator that provides 10.7 MHz center frequency and 400 kHz sweep width.

### OSCILLOSCOPE

Set sweep selector of oscilloscope to "External Sweep". Apply 60 Hz sweep signal from sweep generator to horizontal input terminals of oscilloscope.

- ＊ Set band selector switch to FM.
- ＊ Set balance control to center.
- ＊ Set volume control to minimum.
- ＊ Set treble control to center.
- ＊ Set bass control to center.

| STEP | SWEEP GENERATOR COUPLING | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | INDICATOR | ADJUST | REMARKS |
|---|---|---|---|---|---|---|
| 1 | High side thru. 0.001 mfd to point $TP_2$. Common to chassis. | High side thru. dummy antenna to point $TP_1$. Common to chassis. | Point of non-interference (on/about 89 MHz) | Connect vert. amp. of scope to point $TP_2$. Common to chassis. (Reter to fig. 12) | $T_{101}$ (FM 1 st IFT)<br>$T_{102}$ (FM 2 nd IFT)<br>$T_{201}$ (FM 3 rd IFT)<br>$T_{202}$ (FM 4 th IFT)<br>$T_{204}$ (FM 6 th IFT) | Turn $T_{203}$ and $T_{205}$ upwards and adjust $T_{101}$, $T_{102}$, $T_{201}$, $T_{202}$ and $T_{204}$ (primary) for maximum amplitude and symmetrical curve. (Refer to fig. 13) |
| 2 | ” | ” | ” | ” | $T_{205}$ (FM DISC. IFT) | Adjust $T_{205}$ (primary) so that 10.7 MHz marker is at the center. (Refer to fig. 13) |
| 3 | ” | ” | ” | ” | $T_{203}$ (FM 5th IFT)<br>$T_{204}$ (FM 6th IFT)<br>$T_{205}$ (FM DISC. IFT) | ” |

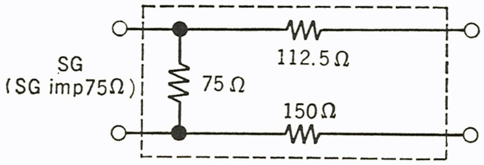
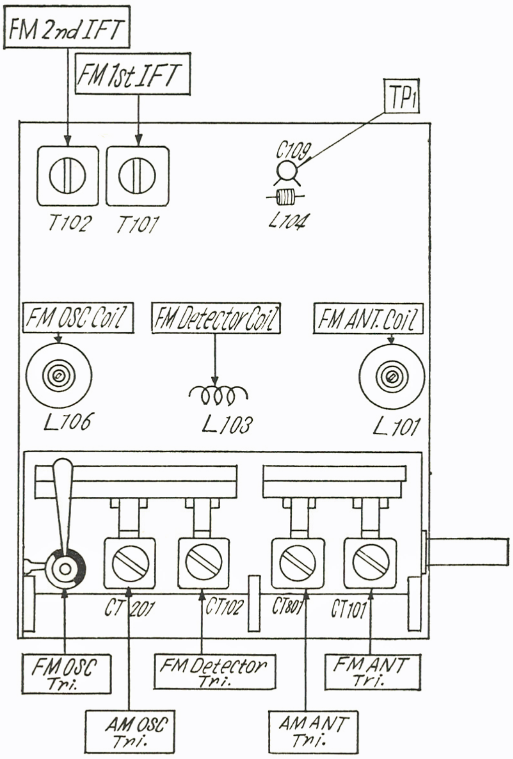


Fig. 11 Fig.14FM Dummy Antenna


FM 2nd IFT
FM 1st IFT
TP1
C109
T102
T101
L104
FM OSC Coil
FM Detector Coil
FM ANT. Coil
L106
L103
L101
CT201
CT102
CT801
CT101
FM OSC Tri.
FM Detector Tri.
FM ANT Tri.
AM OSC Tri.
AM ANT Tri.

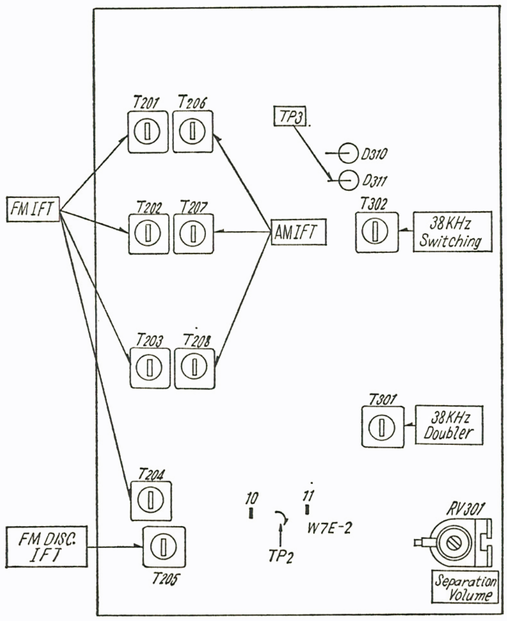

T201
T206
TP3
D310
D311
FM IFT
T202
T207
AM IFT
T302
38KHz Switching
T203
T208
T301
38KHz Doubler
T204
10
11
W7E-2
RV301
FM DISC. IFT
T205
TP2
Separation Volume

Fig. 12 Alignment Point

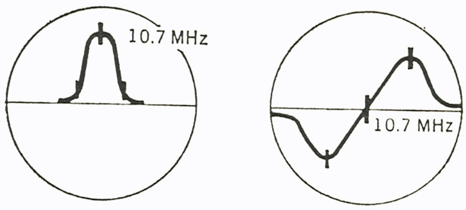


Fig.13

## ■ FM RF ALIGNMENT

Output of of signal generator should be no higher than necessary to obtain an output reading.

- ∗ Set volume control to maximum.
- ∗ Set balance control to center.
- ∗ Set band selector switch to FM.
- ∗ Set treble control to center (flat).
- ∗ Set bass control to center.

| STEP | SIGNAL GENERATOR FREQUENCY | SIGNAL GENERATOR FREQUENCY | RADIO DIAL SETTING | INDICATOR | ADJUST | REMARKS |
|---|---|---|---|---|---|---|
| 1 | Connect to EXT FM antenna terminal thru FM dummy antenna. Common to chassis | 90 MHz (400 Hz Mod) | 90 MHz | Output meter across EXT Speaker Terminal (L) | $L_{106}$ (FM OSC Coil)<br>$L_{101}$ (FM ANT Coil)<br>$L_{103}$ (FM Det. Coil)<br>(Refer to Fig. A) | Adjust for maximum aduio output. |
| 2 | ” | 106 MHz (400 Hz Mod) | 106 MHz | ” | $Ct_{103}$ (FM OSC Trimmer)<br>$Ct_{801}$ (FM ANT Trimmer)<br>$Ct_{102}$ (FM Det. Trimmer) | Adjust for maximum audio output. Repeat steps (1) and (2). |

## 2. FM STEREO ALIGNMENT

### 19 kHz AMP. ALIGNMENT

### EQUIPMENT REQUIRED

- Stereo Modulator......Connect Stereo Modulator output to EXT. Terminal of signal generator.
- Signal Generator......Modulation Rate of 19 kHz Pilot Signal...10%
  - Output Level......30 dB
  - Frequency .........Approximately 90 MHz
- OSCILLOSCOPE
- DUMMY ANTENNA
- VTVM

### CONTROL SETTING & PROCEDURE

Tuner......Band selector switch to FM STEREO, Treble control to minimum, Bass control to minimum, Balance control to center, Volume control to audible level of speaker sound, and dial setting to approximately 90 MHz.

| SEPT | ALIGNMENT | EQUIPMENT CONNECTION | | ADJUST | REMARKS |
|---|---|---|---|---|---|
| | | SIGNAL GENERATOR | OSCILLOSCOPE | | |
| 1 | 19 KHz Amp. | Connect to EXT. FM antenna terminal through dummy antenna | Connect vert. Amp. of scope to point TP2.<br>Common to chassis. | T301 (38 kHz Doubler)<br>T302 (38 kHz Switching) | Adjust T301 and T302 for maximum oscilloscope pattern of 38 kHz |

### SEPARATION ALIGNMENT

### EQUIPMENT REQUIRED

- Stereo Modulator......Connect Stereo Modulator to EXT. Mod. terminal of signal generator.
- Signal Generator......Modulation Rate by 19 kHz Pilot Signal......10%
  - Modulation Rate by Left Signal ..............27%
  - Output Level........................................60%
- OSCILLOSCOPE
- Dummy Antenna 300Ω Balanced
- VTVM

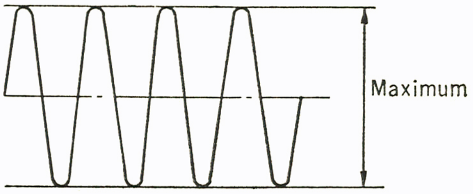


Fig. 14

### CONTROL SETTING & PROCEDURE

Tuner......Band selector switch to FM dial setting to approximately 90 MHz, Treble control to minimum, Bass control to minimum, Balance control to center, Volume control to 500 mW of output level.

| STEP | ALIGNMENT CIRCUIT | ADJUSTMENT | REMARKS |
|---|---|---|---|
| 1 | SEPARATION | RV301 (Separation Control) | Adjust RV301 for the minimum indication on VTVM from the right side output when the left side of stereo modulator is modulated. |

## 3. POWER AMP. ALIGNMENT

### EQUIPMENT REQUIRED

Tester (DC mv Range)
VTVM (DC mv Range)

- Set band selector switch to PHONO.
- Set volume control to minimum.
- Set treble control to cfnter.
- Set bass control to center.
- Set balance control to center.

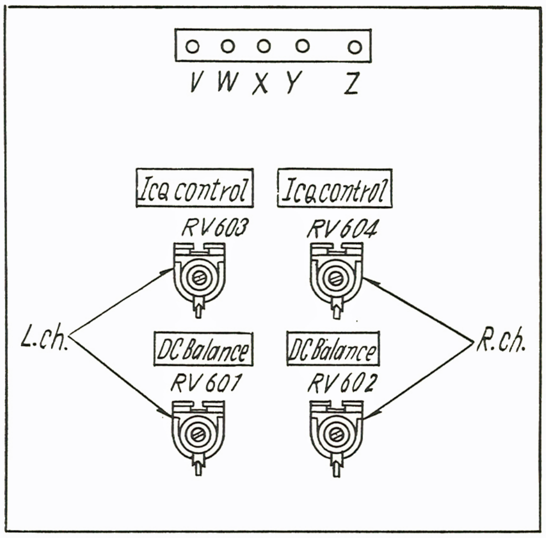

V W X Y Z
Icq control
RV603
Icq control
RV604
L.ch.
R.ch.
DC Balance
RV601
DC Balance
RV602

Fig. 15.

| STEP | ALIGNMENT CIRCUIT | EQUIPMENT CONNECTION | ADJUSTMENT | REMARKS |
|---|---|---|---|---|
| 1 | DC Balance | Connect Tester to Point W and X.<br>Connect Tester to Point Y and X. | RV601 (Lch) | Make adjustments so that the power voltage becomes 0 voltage. |
| 2 | | | RV602 (Rch) | |
| 3 | ICQ Control | Connect VTVM (for DCmV) to point V and W. | RV603 (Lch) | Make adjustments so that the indication on VTVM becomes 12 mV.<br>Repeat steps (1, 2 and 3, 4) |
| 4 | | Connect VTVM (for DCmV) to point Y and Z. | RV604 (Rch) | |

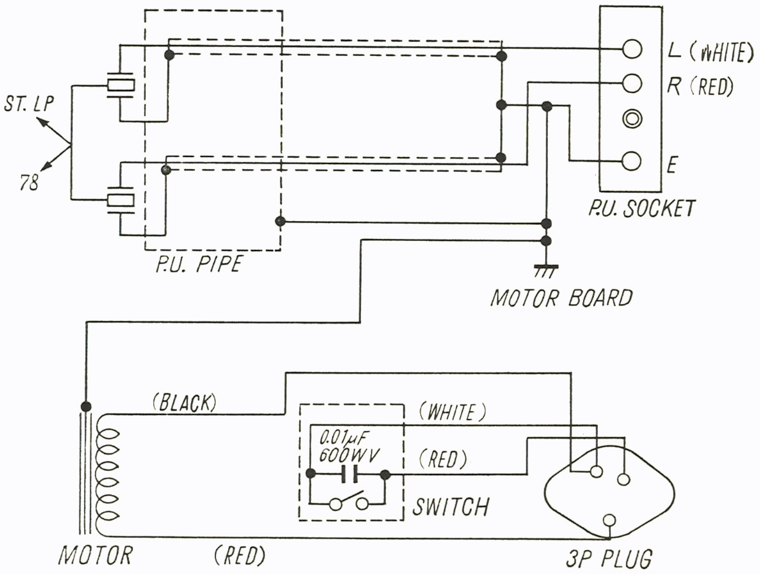
## MEMO

# LOCATION OF PARTS Model SAP-111WD

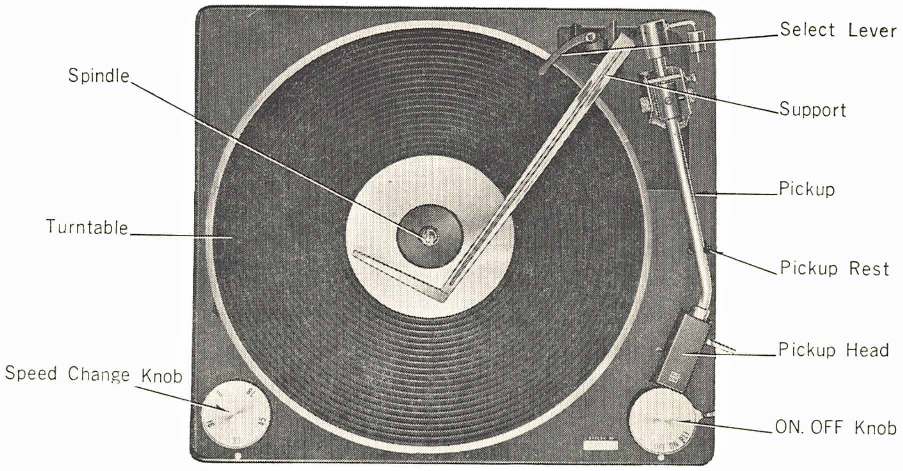
## SPECIFICATIONS

| | |
|---|---|
| Cartridge: | MAGNISTATE (PCM ceramic) |
| Frequency response: | 20–20,000 Hz |
| Output voltage: | 150 mV (50 mm/sec at 1 kHz) |
| Channel balance: | Less than 3 dB at 1 kHz |
| Channel separation: | More than 13 dB at 1 kHz |
| Stylus: | PANASONIC EPS-13TTAD (Diamond) |
| Stylus pressure: | 6g |
| Motor: | 2-pole Synchronous Type |
| Speed: | 16, 33, 45, 78 rpm. |
| S/N: | 40 dB |
| Turntable : | 11 inch stamped metal with beautiful rubber sheet |
| Power supply: | 50/60 Hz, 100V |
| Power consumption: | 13 Watts |
| Cabinet Dimensions: | 18-1/2″(W) × 7-5/8″(H) × 13-3/4″(D) |
| Weight: | 14 lbs. |

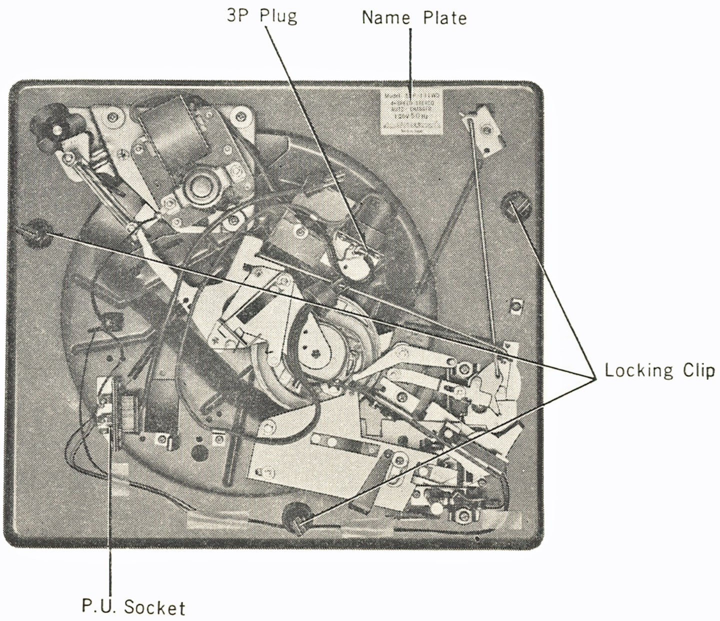
## Schematic Diagram


ST. LP
78
P.U. PIPE
L (WHITE)
R (RED)
E
P.U. SOCKET
MOTOR BOARD
(BLACK)
(WHITE)
0.01μF
600WV
(RED)
SWITCH
MOTOR
(RED)
3P PLUG

## Top View


Spindle
Turntable
Speed Change Knob
Select Lever
Support
Pickup
Pickup Rest
Pickup Head
ON. OFF Knob

## Bottom View


3P Plug
Name Plate
Locking Clip
P.U. Socket

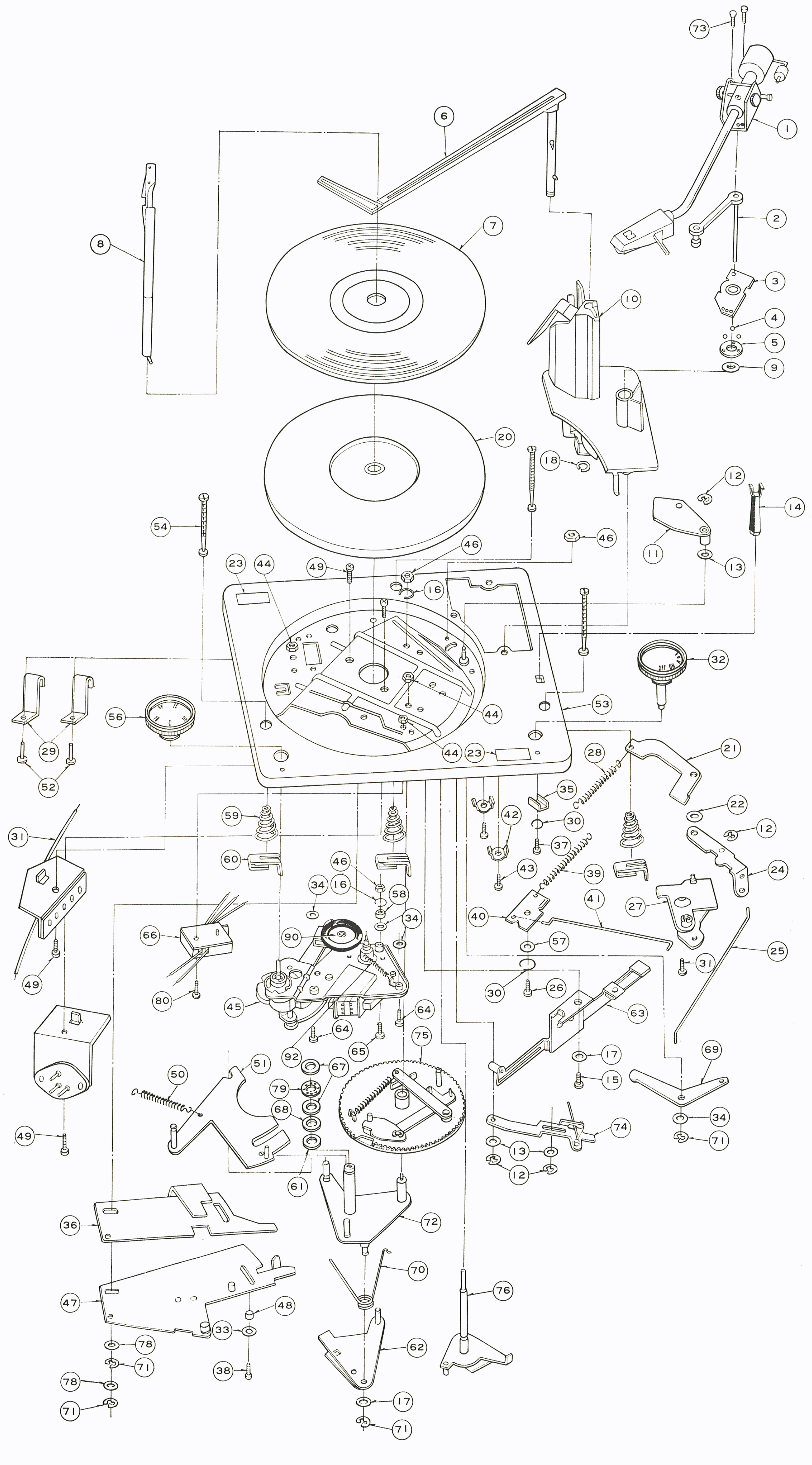
# PARTS LIST

## MODEL SAP-111WD

### (1) RECORD CHANGER

| No. | Part No. | Part Name | No. | Part No. | Part Name |
|---|---|---|---|---|---|
| 1 | CPD-382S(C) | Pickup Ass'y | 36 | G6438-A | H-Plat Ass'y |
| 2 | G6890-C | Elevating Rod Ass'y | 37 | SBSB2608Z | Tapping Screw |
| 3 | G4851-A | Plate Ass'y | 38 | LPSP3010Z | Ass'y Screw |
| 4 | $\frac{1}{16}$ | Steel Ball | 39 | G4524-1 | Spring (ON-OFF) Knob |
| 5 | G6246 | Bearing Holder | 40 | G4520 | Lever (ON-OFF) Knob |
| 6 | G3211-G | Support Ass'y | 41 | G4523 | Rod |
| 7 | G2045-B | Turntable Cover Ass'y | 42 | G4447 | Washer (P.U. Base. Motor Board) |
| 8 | G3210-A | Spindle Ass'y | 43 | SPSP4006Z | Screw |
| 9 | G4517 | Thrust Washer | 44 | NTB3000 | Nut |
| 10 | G0849 | Pickup Base Ass'y | 45 | EM-70641-L | Phono Motor Ass'y |
| 11 | G4490-A | Trip Lever Ass'y | 46 | NTB-4000 | Nut |
| 12 | REE2000 | E Ring | 47 | G3088-C | H-Plate Ass'y |
| 13 | WNB-3000N | Washer | 48 | G4500 | Spacer (H-Plate) |
| 14 | G4900-A | P.U. Arm. Rest | 49 | LPSP3006Z | Ass'y Screw |
| 15 | LRSP4010Z | Ass'y Screw | 50 | G4602 | Spring (Idler Off) |
| 16 | WLS4000 | Lock Washer | 51 | G6545 | Lever (Idler Off) |
| 17 | WNB4000N | Washer | 52 | RTA3006 | Rivet |
| 18 | G4532 | Clip (Support Rod) | 53 | G0848 | Motor Board Ass'y |
| 19 | G8055-A | P.U. Socket Ass'y | 54 | G6342-2 | Mounting Screw |
| 20 | G2061-A | Turntable Ass'y | 55 | G8058-A | 3-pin Plug Ass'y |
| 21 | G4630-3 | Arm (ON-OFF) | 56 | G3131-A | Knob Ass'y (Speed Change) |
| 22 | WSB4000N | Washer | 57 | 03037-126 | Washer |
| 23 | G8266 | Identification Plate | 58 | M0302-405 | Spacer |
| 24 | G4542-A | Arm (Idler Off) Ass'y | 59 | G4579-4 | Conical Spring |
| 25 | G4526-3 | Rod | 60 | G4056 | Locking Clip |
| 26 | SPSP2606Z | Ass'y Screw | 61 | G4631 | Thurust Washer |
| 27 | G4456-C | Set Plate Ass'y | 62 | G4485-A | Spindle Lever Ass'y |
| 28 | G4524-2 | Spring (ON-OFF) | 63 | G3091-C | V-Lever Ass'y |
| 29 | G8046 | Wire Clamp | 64 | M4913-A | Screw Ass'y |
| 30 | WLS2600 | Lock Washer | 65 | M4913-B | Screw Ass'y |
| 31 | Q04007-0-10 | Vinyl wire | 66 | G3341-J | Switch Ass'y |
| 32 | G3220-A | Knob Ass'y | 67 | G5090 | Thrust Washer |
| 33 | Q03091-119 | Washer | 68 | M4710-2 | Rubber Washer |
| 34 | Q03091-109 | Washer | 69 | G4495 | Lever (Shut Off) |
| 35 | G4369-2 | Washer | 70 | G4486 | Spring (Spindle) |

# EXPLODED VIEW OF RECORD CHANGER



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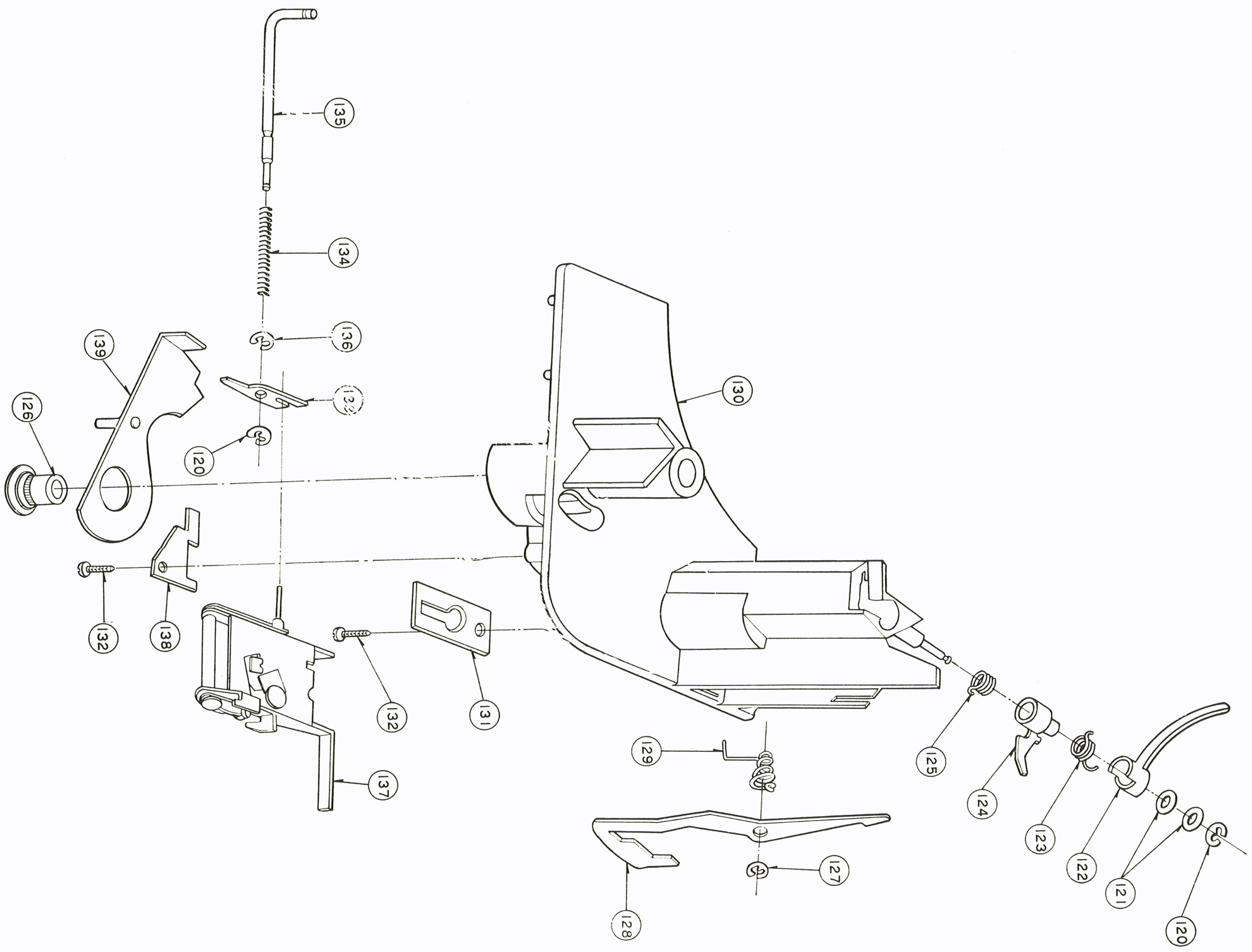
| No. | Part No. | Part Name | No. | Part No. | Part Name |
|---|---|---|---|---|---|
| 71 | G4565-2 | E-Washer | 78 | WSB5000N | Washer |
| 72 | G3085-A | Spindle Bracket Sub Ass'y | 79 | G5070-4 | Bearing |
| 73 | SPSP3004N | Screw | 80 | LPSP3020Z | Ass'y Screw |
| 74 | G4494-A | Trip Slide Ass'y |  | EPC-35TTAD | Cartridge |
| 75 | G3084-A | Gear Ass'y |  | EPS-13TTAD | Stylus (Diamond) |
| 76 | G4515-F | Arm Lever Ass'y |  |  |  |

## (2) PICKUP BASE:

| No. | Part No. | Part Name | No. | Part No. | Part Name |
|---|---|---|---|---|---|
| 120 | REE2000 | E-Ring | 130 | G2029-E | Pick Up Base Ass'y |
| 121 | WSB3000N | Washer | 131 | G4415 | Set Plate (Support Rod) |
| 122 | G4446-2 | Select Lever | 132 | LPSP3006Z | Ass'y Screw |
| 123 | G4445 | Spring (Select Lever) | 133 | G6546-1 | Pusher (Shut Off) |
| 124 | G4444-2 | Select Lever sub-Ass'y | 134 | G4438 | Spring (Shut off Rod) |
| 125 | G4443 | Spring (Select Lever sub-ass'y) | 135 | G6547-2 | Shut Off Rod |
| 126 | G4442 | Bearing (P.U. Arm) | 136 | G4565-2 | E. Washer |
| 127 | G4565-2 | E-Washer | 137 | G3081-C | Stopper Ass'y |
| 128 | G8035 | Lever (Select) | 138 | G4433 | Set Plate (Stopper) |
| 129 | G4416 | Spring (Lever Select) | 139 | G4441-A | Index Lever |

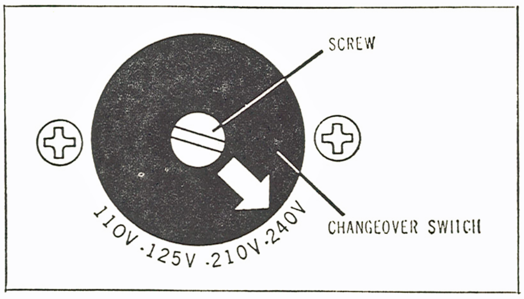
## (3) MOTOR PARTS:

| No. | Part No. | Part Name | No. | Part No. | Part Name |
|---|---|---|---|---|---|
| 150 | M6254-D | Idler Ass'y | 153 | 52906-3 | Idler Spring |
| 151 | M4747-A (50 Hz) | Pulley Ass'y | 154 | 52992-1 | Rubber Bushing |
| 152 | M4747-B (60 Hz) | Pulley Ass'y |  |  |  |



# PREPARATIONS

## POWER SOURCES



This set has four voltage power sources: 110, 125, 210 and 240 volts.

### TO SET VOLTAGE

If the voltage to which the unit is different from that of your area, remove the voltage changeover screws and set the changeover switch to the voltage of your area (You can find the switch at the rear of the cabinet.)

## DX-LOCAL FM SENSITIVITY SELECTOR

Where signals are very strong, slide this selector to LOCAL. In fringe areas where you must bring in the station clearer, slide this selector to DX.

## PHONO CONNECTION

**PHONO 1**...Connect the pick-up lead wire of NATIONAL SS-7000 phonograph with this terminal.

For use with any phonograph other than the NATIONAL SS-7000 be sure to use only those which have a ceramic cartridge.

| | |
|---|---|
| Input voltage | 150 mV |
| Input impedance | 30 kΩ |

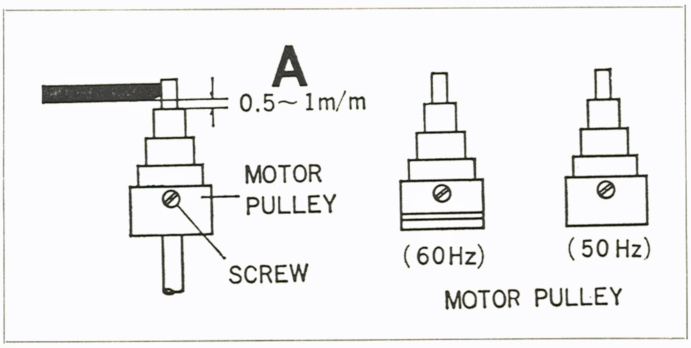
**PHONO 2**...Connect the pickup lead wire of a moving magnetic cartridge with this terminal.

| | |
|---|---|
| Input voltage | 3 mV |
| Input impedance | 50 kΩ |

## HOW TO SET THE POWER SOURCE FREQUENCY

AC power frequency varies not only from country to country, but often from region to region. Therefore, be careful to check the frequency in your area. If it differs from the frequency used previously (as in another region), the motor pulley must be changed to avoid incorrect turntable revolution speed. Follow these steps when changing the motor pulley.

- Remove the turntable rubber, then pull off the clip of the turntable center.
- Lift off the turntable.
- Loosen the screws and remove the motor pulley.
- Attach the other motor pulley.
- Check the length of A. (Set the speed selector knob at 33 and turn the reject lever to ON.)



# INTRODUCTION OF MONOLITHICK IC

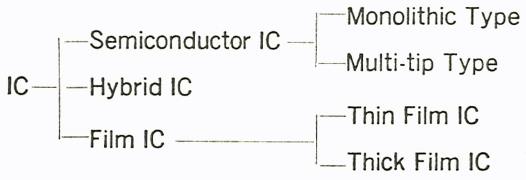
The Equalizer Circuit of SS-7000 uses IC (shown in the Circuit Diagram $IC_{401}$ AN-204). Please read through the following explanation and make the best use of it.

## General Theory of IC

### ■ IC (Integrated Circuit)

Since Texas Instruments, USA, developed know-how to make transistors, diodes, resistors, capacitors, etc. on a minute single base plate in 1958, this technique is widely applied to electric appliances.

### ■ Classifications by manufacturing method of IC



### ■ Advantages of IC

1) Compactness and light weight.
2) Small electric consumption.
3) Low cost if mass-produced.
4) High reliability
5) Fewer manufacturing processes needed.
6) Simple procedure to make the intricate circuit.

## MONOLITHIC TYPE SEMICONDUCTOR IC

The Semiconductor IC consists of a number of transistors, diodes, resistors and capacitors combined together on a silicon base plate of about 1 mm square. It is manufactured by use of photographic technology.

### ■ IC AN-204 (For Model SS-7000)

AN-204 is a monolithic type semiconductor IC for low-frequency amplification, developed by Matsushita Electronics Corporation. 10 transistors, 6 diodes, 10 resistors and 2 capacitors are built in one chip, and 12 feet are attached to the IC.

Makes no loud noise and shows high loop gain. When used for an MM cartridge equalizer circuit, it helps attain a sufficient amount of feedback gain. It, therefore, constitutes a stable cartridge equalizing circuit almost free distortion.

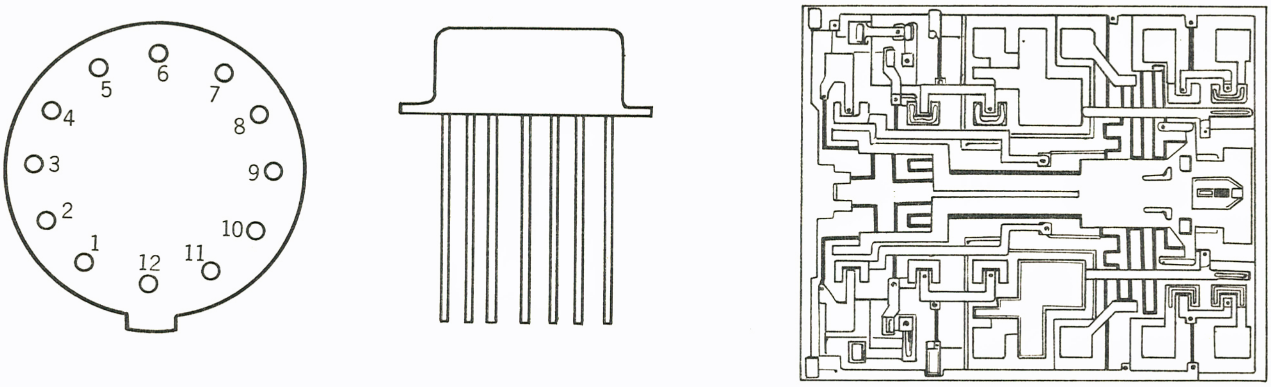

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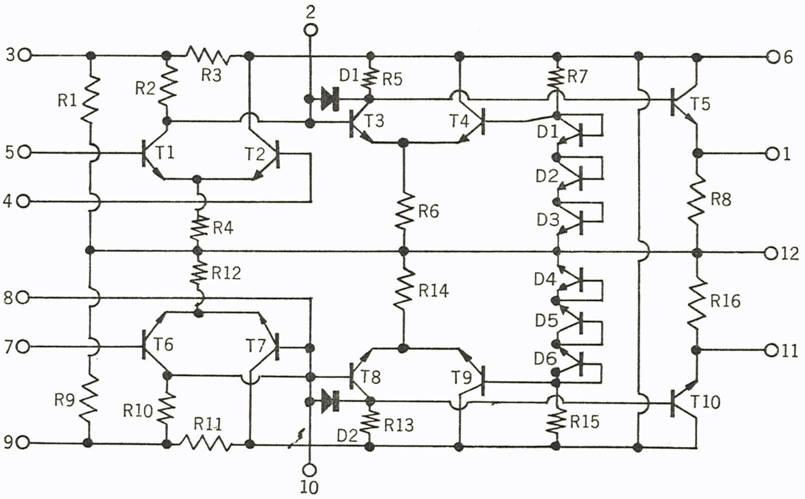
Fig. 1


2
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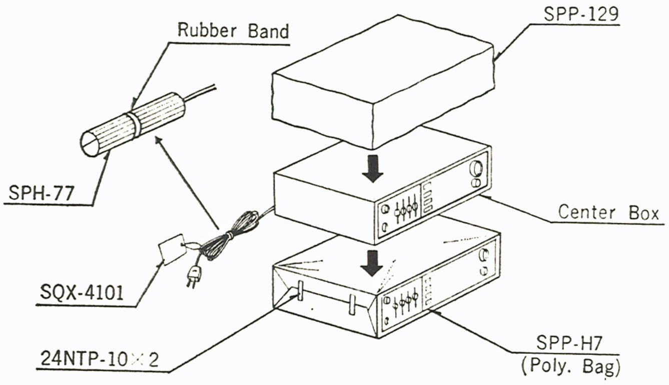
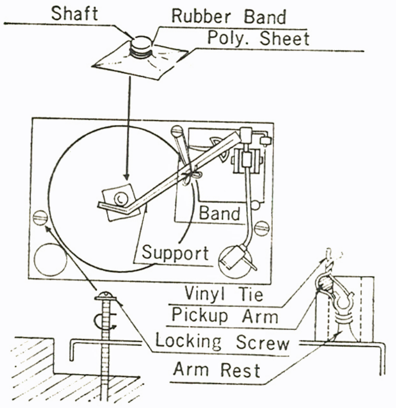
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
T1
T2
T3
T4
T5
T6
T7
T8
T9
T10
D1
D2
D3
D4
D5
D6

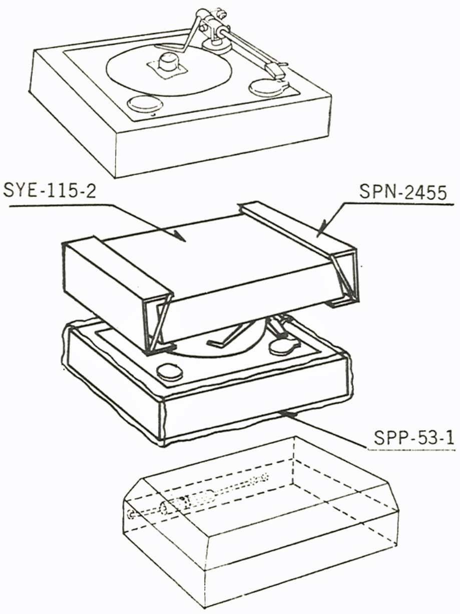
Fig. Equalizer (Equivalent) Circuit

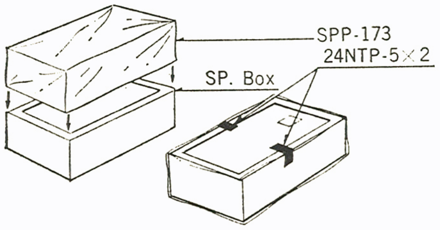
## MEMO

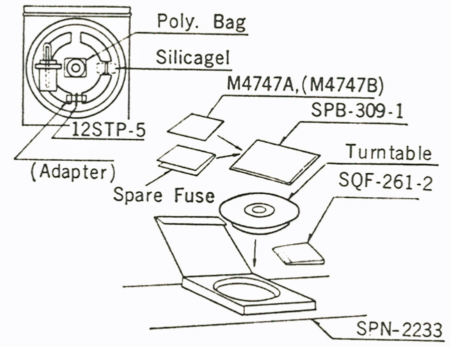
# COMPONENT PACKING PROCEDURE

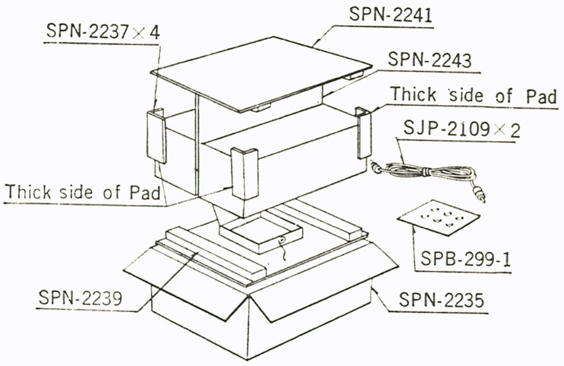

Rubber Band
SPP-129
SPH-77
Center Box
SQX-4101
24NTP-10×2
SPP-H7
(Poly. Bag)

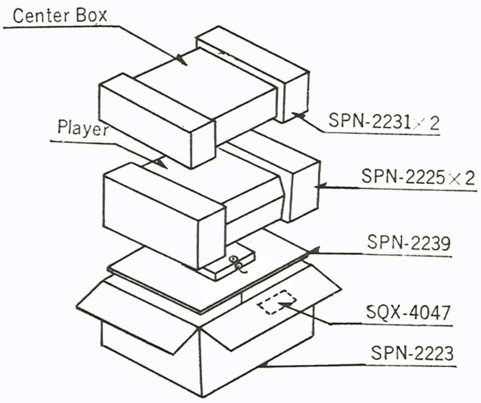

Shaft
Rubber Band
Poly. Sheet
Band
Support
Vinyl Tie
Pickup Arm
Locking Screw
Arm Rest

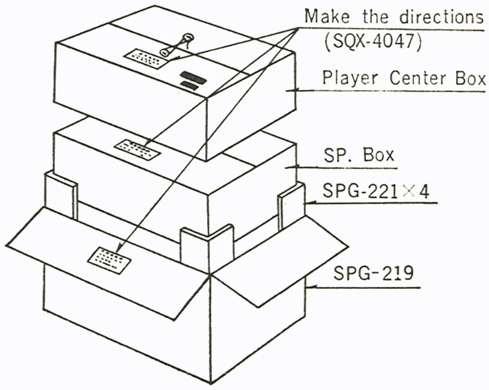

SYE-115-2
SPN-2455
SPP-53-1


SPP-173
24NTP-5×2
SP. Box


Poly. Bag
Silicagel
M4747A, (M4747B)
SPB-309-1
12STP-5
Turntable
(Adapter)
SQF-261-2
Spare Fuse
SPN-2233

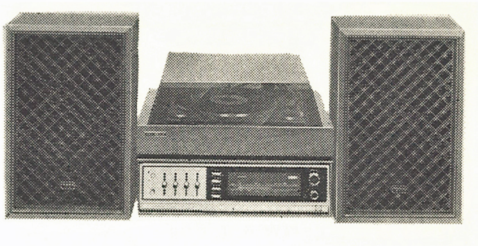

SPN-2241
SPN-2237×4
SPN-2243
Thick side of Pad
SJP-2109×2
Thick side of Pad
SPB-299-1
SPN-2239
SPN-2235


Center Box
SPN-2231×2
Player
SPN-2225×2
SPN-2239
SQX-4047
SPN-2223


Make the directions
(SQX-4047)
Player Center Box
SP. Box
SPG-221×4
SPG-219

# REPLACEMENT PARTS LIST
# STEREO SYSTEM
# MODEL SS-7000

**NOTES:**
1. Part numbers are indicated on most mechanical parts. Please use this number, for parts which have no Ref. No.
2. ISO metric thread screws & parts which employ ISO metric thread screws are identified by ISO marking ((ISO)).
3. Ⓝ indicates the New Parts.



SS-7000

| Ref. No. | Description | Part No. | Per Set (Pcs.) | Remarks | Price | |
|---|---|---|---|---|---|---|
| | **TRANSISTORS** | | | | | |
| TR101 | FM RF Amp. | 3SK32A | 1 | | | |
| TR102 | FM Mixer | 2SC381BN | 1 | | | |
| TR103 | FM Osc. | 2SC381BN | 1 | | | |
| TR201 | FM 1st IF Amp. | 2SC381BN | 1 | | | |
| TR202 | FM 2nd IF Amp., AM 1st IF Amp. | 2SC381BN | 1 | | | |
| TR203 | FM 3rd IF Amp., AM 2nd IF Amp. | 2SC645A | 1 | | | |
| TR204 | FM Limiter | 2SC645A | 1 | | | |
| TR205 | AM Converter | 2SA102CA | 1 | | | |
| TR301 | Distributor | 2SC828R | 1 | | | |
| TR302 | 19 kHz Amp. | 2SC828R | 1 | | | |
| TR303 | 38 kHz Amp. | 2SC828R | 1 | | | |
| TR304 | 38 kHz Switching | 2SC828R | 1 | | | |
| TR305 | Lighting | 2SA550R | 1 | | | |
| IC401 | Equalizer Amp. | AN204 | 1 | Ⓝ | | |
| TR501, 502 | Pre. Amp. | 2SA564FQ | 2 | | | |
| TR601, 602 | 1st Driver | A2SA564FQ | 2 | | | |
| TR603, 604 | 2nd Driver | A2SC538Q | 2 | | | |
| TR605, 606 | 3rd Driver | A2SC538Q | 2 | | | |
| TR607, 608 | 3rd Driver | A2SA550QRS | 2 | | | |
| TR701 | Rectifier | 2SB324H | 1 | | | |
| TR609, 610, 611, 612 | Power Amp. | A2SD226P | 4 | | | |
| | **COILS** | | | | | |
| L101 | FM Ant. Coil | SLA4P3 | 1 | | | |
| L102, 105 | Choke Coil | SLQX250-1 | 2 | | | |
| L103 | FM Detector Coil | SLD4Y11 | 1 | | | |
| L104 | 10.7 MHz Trap Coil | ELQ5A9 | 1 | | | |
| L106 | FM Osc. Coil | SLQ4P13 | 1 | Ⓝ | | |

## SS-7000

| Ref. No. | Description | Part No. | Per Set (Pcs.) | Remarks | Price | |
|---|---|---|---|---|---|---|
| L201, 202 | Choke Coil | SLQX250-1 | 2 | | | |
| L203 | Choke Coil | ELQ6A11 | 1 | | | |
| L204 | MW Osc. Coil | SLO2P1 | 1 | | | |
| L301 | SCA Filter | ELQ393D599G | 1 | | | |
| L801 | MW Ant. Coil | SLF2D3 | 1 | | | |
| | **DIODES** | | | | | |
| D101 | FM AGC | OA79 | 1 | | | |
| D201 | AM AGC | OA70 | 1 | | | |
| D202, 203 | Bias Diode | MA26 | 2 | | | |
| D204, 205 | Voltage Doubler Rectifier | OA79 | 2 | | | |
| D206, 207 | Meter Diode | OA79 | 2 | | | |
| D208 | Meter Diode | OA70 | 1 | | | |
| D209 | AM Detector | OA70 | 1 | | | |
| D210, 211 | FM Detector | 2OA79 | 1 Pair | | | |
| D301 | Temperture Compensator | MA26 | 1 | | | |
| D303 | 38 kHz Doubler | OA70 | 1 | | | |
| D304 | Auto Switching | OA70 | 1 | | | |
| D305 | | MA26 | 1 | | | |
| D306, 307 | Temperture Compensator | MA26 | 2 | | | |
| D308–311 | 38 kHz Switching | 2OA70 | 4 | | | |
| D601, 602, 604, 605 | Temperture Compensator | MA26 | 2 Pair | | | |
| D603, 606 | Temperture Compensator | DS410 | 2 | | | |
| D701 | Rectifier | 1S1850 | 1 | | | |
| D702 | Rectifier | 1S1850R | 1 | | | |
| D703 | Stabilizer | 1S1717 | 1 | | | |
| | **TRANSFORMERS** | | | | | |
| T101 | FM 1st IFT | EIF10S211A | 1 | | | |
| T102 | FM 2nd IFT | EIF10S205B | 1 | | | |
| T201 | FM 3rd IFT | SLI4C103 | 1 | | | |
| T202 | FM 4th IFT | SLI4C103 | 1 | | | |
| T203 | FM 5th IFT | SLI4C103 | 1 | | | |
| T204 | FM 6th IFT | SLI4C501 | 1 | | | |
| T205 | FM Disc. IFT | EIF10S211F | 1 | | | |
| T206 | AM IFT | SLI2C115 | 1 | | | |
| T207 | AM IFT | EIA10S216BM | 1 | | | |

| Ref. No. | Description | Part No. | Per Set (Pcs.) | Remarks | Price | |
|---|---|---|---|---|---|---|
| T208 | AM IFT | SLI2C407 | 1 | | | |
| T301 | 38 kHz Doubler | SLM1C3T | 1 | | | |
| T302 | 38 kHz Switching | SLM1C7T | 1 | | | |
| T801 | Power Trans. | SLT5N27 | 1 | Ⓝ | | |
| | **RESISTORS**<br>**(FM RF CIRCUIT BOARD)** | | | | | |
| R101 | Carbon 56 KΩ ±5% 1/4 W | ERD14VJ563 | 1 | | | |
| R102 | Carbon 120 KΩ ±5% 1/4 W | ERD14VJ124 | 1 | | | |
| R103 | Carbon 100 KΩ ±5% 1/4 W | ERD14VJ104 | 1 | | | |
| R104 | Carbon 470 KΩ ±5% 1/4 W | ERD14VJ474 | 1 | | | |
| R105, 108 | Carbon 220Ω ±5% 1/4 W | ERD14VJ221 | 2 | | | |
| R106, 110 | Carbon 10 KΩ ±5% 1/4 W | ERD14VJ103 | 2 | | | |
| R107 | Carbon 1.8 KΩ ±5% 1/4 W | ERD14VJ182 | 1 | | | |
| R109 | Carbon 3.9 KΩ ±5% 1/4 W | ERD14VJ392 | 1 | | | |
| | **(AM RF, FM IF CIRCUIT BOARD)** | | | | | |
| R201,205,212 | Carbon 22 KΩ ±5% 1/4 W | ERD14VJ223 | 3 | | | |
| R202 | Carbon 3.9 KΩ ±5% 1/4 W | ERD14TJ392 | 1 | | | |
| R203 | Carbon 470Ω ±5% 1/4 W | ERD14TJ471 | 1 | | | |
| R204, 322 | Carbon 1.5 KΩ ±5% 1/4 W | ERD14VJ152 | 2 | | | |
| R206,222,228, 238,310 | Carbon 220Ω ±5% 1/4 W | ERD14VJ221 | 5 | | | |
| R207,214,224 | Carbon 22Ω ±5% 1/4 W | ERD14VJ220 | 3 | | | |
| R208 | Carbon 3.9 KΩ ±5% 1/4 W | ERD14VJ392 | 1 | | | |
| R209,220,307, 319,337,814 | Carbon 470Ω ±5% 1/4 W | ERD14VJ471 | 6 | | | |
| R210,211,230, 232,233,311, 326–329 | Carbon 1 KΩ ±5% 1/4 W | ERD14VJ102 | 10 | | | |
| R213, 301 | Carbon 10Ω ±5% 1/4 W | ERD14VJ100 | 2 | | | |
| R215, 221 | Carbon 270Ω ±5% 1/4 W | ERD14VJ271 | 2 | | | |
| R216,334,335 | Carbon 18 KΩ ±5% 1/4 W | ERD14VJ183 | 3 | | | |
| R218 | Carbon 2.2 KΩ ±5% 1/4 W | ERD14VJ222 | 1 | | | |
| R219, 231 | Carbon 27 KΩ ±5% 1/4 W | ERD14VJ273 | 2 | | | |
| R223 | Carbon 8.2 KΩ ±5% 1/4 W | ERD14TJ822 | 1 | | | |
| R225,239,306 | Carbon 1.2 KΩ ±5% 1/4 W | ERD14VJ122 | 3 | | | |
| R226 | Carbon 120 KΩ ±5% 1/4 W | ERD14VJ124 | 1 | | | |
| R227, 312 | Carbon 6.8 KΩ ±5% 1/4 W | ERD14VJ682 | 2 | | | |
| R229 | Carbon 560Ω ±5% 1/4 W | ERD14VJ561 | 2 | | | |
| R231 | Carbon 68Ω ±5% 1/4 W | ERD14VJ680 | 1 | | | |
| R234 | Carbon 100 KΩ ±5% 1/4 W | ERD14VJ104 | 1 | | | |

| Ref. No. | Description | Part No. | Per Set (Pcs.) | Remarks | Price | |
|---|---|---|---|---|---|---|
| R235 | Carbon 33 KΩ ±5% 1/4 W | ERD14VJ333 | 1 | | | |
| R217,237,315 | Carbon 3.3 KΩ ±5% 1/4 W | ERD14VJ332 | 3 | | | |
| R240 | Carbon 220Ω ±5% 1/4 W | ERD14TJ221 | 1 | | | |
| R241 | Carbon 33Ω ±5% 1/4 W | ERD14VJ330 | 1 | | | |
| R302,309,320 | Carbon 39 KΩ ±5% 1/4 W | ERD14VJ393 | 3 | | | |
| R303 | Carbon 15 KΩ ±5% 1/4 W | ERD14VJ153 | 1 | | | |
| R304, 330−333 | Carbon 47 KΩ ±5% 1/4 W | ERD14VJ473 | 5 | | | |
| R305 | Carbon 680Ω ±5% 1/4 W | ERD14VJ681 | 1 | | | |
| R308, 321 | Carbon 56 KΩ ±5% 1/4 W | ERD14VJ563 | 2 | | | |
| R313, 314 | Carbon 8.2 KΩ ±5% 1/4 W | ERD14VJ822 | 2 | | | |
| R316, 324 | Carbon 390Ω ±5% 1/4 W | ERD14VJ391 | 2 | | | |
| R317 | Carbon 2.7 KΩ ±5% 1/4 W | ERD14VJ272 | 1 | | | |
| R318 | Carbon 4.7 KΩ ±5% 1/4 W | ERD14VJ472 | 1 | | | |
| R323 | Carbon 5.6 KΩ ±5% 1/4 W | ERD14VJ562 | 1 | | | |
| R325 | Carbon 10Ω ±5% 1/4 W | ERD14VJ100 | 1 | | | |
| RV301 | Variable Resistor (Separation) | EVLS3AA00B32 | 1 | | | |
| | **(Equalizer CIRCUIT BOARD)** | | | | | |
| R401, 402 | Carbon 220Ω ±5% 1/4 W | ERD14VJ221 | 2 | | | |
| R403, 404 | Carbon 270 KΩ ±10% 1/2 W | ERD12TK274 | 2 | | | |
| R405, 406 | Carbon 120 KΩ ±10% 1/2 W | ERD12TK124 | 2 | | | |
| R407, 408 | Carbon 820Ω ±5% 1/4 W | ERD14VJ821 | 2 | | | |
| R409, 410 | Carbon 150 KΩ ±5% 1/4 W | ERD14VJ154 | 2 | | | |
| R411, 412 | Carbon 33 KΩ ±5% 1/4 W | ERD14VJ333 | 2 | | | |
| R413, 414 | Carbon 470 KΩ ±5% 1/4 W | ERD14VJ474 | 2 | | | |
| R415, 416 | Carbon 330 KΩ ±5% 1/4 W | ERD14VJ334 | 2 | | | |
| R417, 418 | Carbon 4.7 KΩ ±5% 1/4 W | ERD14VJ472 | 2 | | | |
| R419 | Carbon 1.2 KΩ ±5% 1/4 W | ERD14VJ122 | 1 | | | |
| R420, 421 | Carbon 1.5 KΩ ±5% 1/4 W | ERD14VJ152 | 2 | | | |
| | **(Tone Control Amp. CIRCUIT BOARD)** | | | | | |
| R501, 502 | Carbon 12 KΩ ±5% 1/4 W | ERD14VJ123 | 2 | | | |
| R503, 504 | Carbon 4.7 KΩ ±5% 1/4 W | ERD14VJ472 | 2 | | | |
| R505, 506 | Carbon 180 KΩ ±5% 1/4 W | ERD14VJ184 | 2 | | | |
| R507, 508 | Carbon 120 KΩ ±5% 1/4 W | ERD14VJ124 | 2 | | | |
| R509−512 | Carbon 8.2 KΩ ±5% 1/4 W | ERD14VJ822 | 4 | | | |
| R513, 514 | Carbon 680Ω ±5% 1/4 W | ERD14VJ681 | 2 | | | |
| R515, 516 | Carbon 6.8 KΩ ±5% 1/4 W | ERD14VJ682 | 2 | | | |
| R517, 518 | Carbon 2.2 KΩ ±5% 1/4 W | ERD14VJ222 | 2 | | | |

| Ref. No. | Description | Part No. | Per Set (Pcs.) | Remarks | Price | |
|---|---|---|---|---|---|---|
| R519, 520 | Carbon 3.9 KΩ ±5% 1/4 W | ERD14VJ392 | 2 | | | |
| RV501 | Balance Volume | EVAI6AA06G15-A | 1 | | | |
| RV502, 503 | Volume | EVBH5AA06B54-A | 1 | | | |
| RV504-507 | Tone Volume | EVBH0AA06V54-O | 2 | | | |
| | **(Power Amp. CIRCUIT BOARD)** | | | | | |
| R601, 602 | Carbon 33 KΩ ±5% 1/4 W | ERD14TJ333 | 2 | | | |
| R603, 604 | Carbon 10 KΩ ±5% 1/4 W | ERD14TJ103 | 2 | | | |
| R605, 606 | Carbon 1 KΩ ±5% 1/4 W | ERD14TJ102 | 2 | | | |
| R607, 608 | Carbon 56Ω ±5% 1/4 W | ERD14TJ560 | 2 | | | |
| R609, 610 | Carbon 8.2 KΩ ±5% 1/4 W | ERD14TJ822 | 2 | | | |
| R611, 612 | Carbon 2.7 KΩ ±5% 1/4 W | ERD14TJ272 | 2 | | | |
| R613, 614 | Carbon 1.5 KΩ ±5% 1/4 W | ERD14TJ152 | 2 | | | |
| R615, 616 | Carbon 100Ω ±10% 1/2 W | ERD12TCK101 | 2 | | | |
| R617, 618 | Carbon 560Ω ±5% 1/4 W | ERD14TJ561 | 2 | | | |
| R619, 620 | Carbon 15Ω ±10% 1/2 W | ERD12TCK150 | 2 | | | |
| R621, 622, 625, 626 | Carbon 120Ω ±5% 1/4 W | ERD14TJ121 | 4 | | | |
| R623, 624 | Carbon 15Ω ±5% 1/4 W | ERD14TJ150 | 2 | | | |
| R627-630 | Wire 0.39Ω ±10% 1/2 W | ERM12PK39 | 4 | | | |
| RV601, 602 | DC Balance | EVLS3AA00B14 | 2 | | | |
| RV603, 604 | ICQ Control | EVLS3AA00B52 | 2 | | | |
| | **(RECTIFIER CIRCUIT BOARD)** | | | | | |
| R701 | Carbon 68Ω ±10% 1/2 W | ERD12TK680 | 1 | | | |
| R702 | Carbon 3.3 KΩ ±5% 1/4 W | ERD14TJ332 | 1 | | | |
| R703 | Carbon 1 KΩ ±5% 1/4 W | ERD14TJ102 | 1 | | | |
| | **(FM Ant. Att. CIRCUIT BOARD)** | | | | | |
| R801, 804 | Carbon 330Ω ±5% 1/4 W | ERD14TJ331 | 2 | | | |
| R802, 803 | Carbon 1.5 KΩ ±5% 1/4 W | ERD14TJ152 | 2 | | | |
| | **(Chassis)** | | | | | |
| R805, 806 | Carbon 82 KΩ ±5% 1/4 W | ERD14TJ823 | 2 | | | |
| R807, 808 | Carbon 120 KΩ ±5% 1/4 W | ERD14TJ124 | 2 | | | |
| R809, 810 | Carbon 220 KΩ ±5% 1/4 W | ERD14TJ224 | 2 | | | |
| R813 | Carbon 2.2 KΩ ±5% 1/4 W | ERD14TJ222 | 1 | | | |
| R815 | Carbon 1 KΩ ±5% 1/4 W | ERD14TJ102 | 1 | | | |
| R816 | Carbon 2.7 KΩ ±5% 1/4 W | ERD14TJ272 | 1 | | | |
| R817, 818 | Wire 6.8Ω 6 W | ERM6P6R8 | 2 | Ⓝ | | |
| | | | | | | |
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| Ref. No. | Description | Part No. | Per Set (Pcs.) | Remarks | Price | |
|---|---|---|---|---|---|---|
| | **CAPACITORS**<br>**(FM RF CIRCUIT BOARD)** | | | | | |
| C101 | Ceramic 18pF ±10% WV-50V | ECCD05180K | 1 | | | |
| C102, 107 | Ceramic 7pF ±0.5pF WV-50V | ECCD05070D | 2 | | | |
| C103,117,118 | Ceramic 0.033μF $^{+100}_{-0}$% WV-50V | ECKE05333PJ | 3 | | | |
| C104, 105, 110, 115 | Ceramic 0.0022μF ±20% WV-50V | ECKE05222MY | 4 | | | |
| C106 | Ceramic 15pF ±10% WV-50V | ECCD05150K | 1 | | | |
| C108 | Ceramic 3pF ±0.25pF WV-50V | ECCD05030C | 1 | | | |
| C109 | Ceramic 330pF ±10% WV-500V | ECKD5331KF | 1 | | | |
| C111 | Ceramic 1.5pF ±0.25pF WV-50V | ECCD051R5C | 1 | | | |
| C112 | Ceramic 2pF ±0.25pF WV-50V | ECCD05020C | 1 | | | |
| C113 | Mica 10pF ±10% WV-50V | ECMS05100K | 1 | | | |
| C114 | Mica 33pF ±10% WV-50V | ECMS05330K | 1 | | | |
| C116 | Mica 12pF ±10% WV-50V | ECMS05120K | 1 | | | |
| | **(AM RF & FM IF CIRCUIT BOARD)** | | | | | |
| C201–206,208, 209,211,212, 214,215,218–222,224,303 | Ceramic 0.01μF ±5% WV-50V | ECKE05103PJ | 19 | | | |
| C207 | Electrolytic 1μF WV-50V | ECEA50V1N | 1 | | | |
| C210,228,302 | Electrolytic 4.7μF WV-25V | ECEA25V4R7N | 3 | | | |
| C213, 217 | Ceramic 33pF ±10% WV-50V | ECCD05330K | 2 | | | |
| C223 | Electrolytic 33μF WV-6V | ECEA6V33N | 1 | | | |
| C225, 301 | Ceramic 150pF ±10% WV-50V | ECCD05151K | 2 | | | |
| C226 | Ceramic 330pF ±10% WV-500V | ECKD5331KF | 1 | | | |
| C229, 310 | Polyester 0.01μF ±10% WV-50V | ECQG05103KZ | 2 | | | |
| C230, 231 | Ceramic 0.0047μF ±20% WV-50V | ECKE05472MY | 2 | | | |
| C232 | Ceramic 10pF ±10% WV-50V | ECCD05100K | 1 | | | |
| C233 | Polystyrene 370pF ±5% WV-100V | ECQS1371JX | 1 | | | |
| C304 | Electrolytic 10μF WV-10V | ECEA10V10N | 1 | | | |
| C305, 311 | Electrolytic 47μF WV-10V | ECEA10V47N | 3 | | | |
| C306 | Polyester 0.022μF ±10% WV-50V | ECQG05223KZ | 1 | | | |
| C307 | Polyester 0.0068μF ±10% WV-50V | ECQG05682KZ | 1 | | | |
| C308, 313 | Polyester 0.033μF ±10% WV-50V | ECQG05333KZ | 2 | | | |
| C314 | Polyester 0.047μF ±10% WV-50V | ECQG05473KZ | 1 | | | |
| C315 | Polyester 0.015μF ±10% WV-50V | ECQG05153KZ | 1 | | | |
| C316 | Porystylene 3300pF ±10% WV-100V | ECQS1332KX | 1 | | | |
| C317 | Polyester 0.1μF ±10% WV-50V | ECQG05104KZ | 1 | | | |
| C318, 319 | Polyester 0.0033μF ±10% WV-50V | ECQG05332KZ | 2 | | | |

| Ref. No. | Description | Part No. | Per Set (Pcs.) | Remarks | Price | |
|---|---|---|---|---|---|---|
| C320, 321 | Polyester 0.068μF ±10% WV-60V | ECQG05683KZ | 2 | | | |
| | (**Equalizer CIRCUIT BOARD**) | | | | | |
| C401, 402 | Polyester 0.1μF WV-50V | ECQG05104KZ | 2 | | | |
| C403, 404 | Electrolytic 3.3μF WV-25V | ECEA25V3R3N | 2 | | | |
| C405, 406 | Electrolytic 220μF WV-6V | ECEA6V220N | 2 | | | |
| C407, 408 | Ceramic 330pF ±10% WV-500V | ECKD5331KF | 2 | | | |
| C409, 410 | Polyester 0.0047μF ±10% WV-50V | ECQG05472KZ | 2 | | | |
| C413, 414 | Electrolytic 10μF WV-10V | ECEA10V10N | 2 | | | |
| C415, 416 | Polyester 0.01μF ±10% WV-50V | ECQG05103KZ | 2 | | | |
| C419–422 | Electrolytic 1μF WV-50V | ECEA50V1N | 4 | | | |
| C423 | Electrolytic 220μF WV-16V | ECEA16V220N | 1 | | | |
| | (**Tone Control Amp. CIRCUIT BOARD**) | | | | | |
| C503, 504 | Polyester 0.001μF ±10% WV-50V | ECQG05102KZ | 2 | | | |
| C505, 506 | Polyester 0.068μF ±10% WV-50V | ECQG05683KZ | 2 | | | |
| C507, 508 | Electrolytic 0.47μF WV-25V | ECAG25ER47 | 2 | | | |
| C509, 510 | Electrolytic 33μF WV-6V | ECEA6V33N | 2 | | | |
| C511, 512 | Electrolytic 4.7μF WV-25V | ECEA25V4R7N | 2 | | | |
| C513, 514 | Polyester 0.015μF ±10% WV-50V | ECQG05153KZ | 2 | | | |
| C515, 516 | Polyester 0.15μF ±10% WV-50V | ECQG05154KZ | 2 | | | |
| C517, 518 | Polyester 0.0047μF ±10% WV-50V | ECQG05472KZ | 2 | | | |
| C519, 520 | Polyester 0.022μF ±10% WV-50V | ECQG05223KZ | 2 | | | |
| C521 | Electrolytic 220μF WV-16V | ECEA16V220N | 1 | | | |
| | (**Power Amp. CIRCUIT BOARD**) | | | | | |
| C601, 602 | Electrolytic 0.33μF WV-25V | ECAG25ER33 | 2 | | | |
| C603, 604 | Electrolytic 0.22μF WV-25V | ECAG25ER22 | 2 | | | |
| C605, 606 | Ceramic 150pF ±10% WV-50V | ECCD05151K | 2 | | | |
| C607, 608 | Electrolytic 1000μF WV-6V | ECEA6V1000N | 2 | | | |
| C609, 610 | Ceramic 47pF ±10% WV-50V | ECCD05470K | 2 | | | |
| C611, 612 | Electrolytic 220μF WV-25V | ECEA25V220N | 2 | | | |
| C613, 614 | Electrolytic 10μF WV-10V | ECEA10V10N | 2 | | | |
| C615, 616 | Electrolytic 47μF WV-25V | ECEA25V47N | 2 | | | |
| C617, 618 | Ceramic 0.01μF ±5% WV-50V | ECKE05103PJ | 2 | | | |
| | (**RECTIFIER CIRCUIT BOARD**) | | | | | |
| C701 | Polyester 0.033μF ±10% WV-50V | ECQG05333KZ | 1 | | | |
| C702, 703 | Electrolytic 2200μF WV-25V | ECEB25V2200N | 2 | | | |
| C704, 705 | Ceramic 0.033μF ±5% WV-50V | ECKE05333PJ | 2 | | | |
| C706 | Electrolytic 47μF WV-16V | ECEA16V47N | 1 | | | |

## SS-7000

| Ref. No. | Description | Part No. | Per Set (Pcs.) | Remarks | Price | |
|---|---|---|---|---|---|---|
| C707 | Electrolytic 100μF WV-10V | ECEA10V100N | 1 | | | |
| C801 | Paper 0.01μF ±20% WV-450V | ECNU4A103M | 1 | | | |
| C802 | Paper 0.001μF ±20% WV-450V | ECNU4A102M | 1 | | | |
| C803, 804 | Electorlytic 220μF WV-25V | ECEA25V220N | 2 | | | |
| C807 | Ceramic 330 pF ±10% WV-500V | ECKD5331KF | 1 | | | |
| | **COMPONENT COMBINATIONS** | | | | | |
| CR201 | 0.01μF, 0.01μF & 470Ω | EXAF203Z471 | 1 | | | |
| CR202 | 10.7 MHz Filter | EXADG03 | 1 | | | |
| CR301, 302 | 19 KHz Filter | EXA6FC04 | 2 | | | |
| | **SWITCHES** | | | | | |
| S1, 2 | DX Local Switch | ESD1414 | 1 | | | |
| S3-8 | Selector Switch | SSRC364L25B1 | 1 | Ⓝ | | |
| S9, 10 | Mode Switch | SST13S | 1 | ISO | | |
| S11, 12 | Tape Monitor Switch | SST13S | 1 | ISO | | |
| S13, 14 | Main. Speaker Switch | SST13S | 1 | ISO | | |
| S15, 16 | Remote Speaker Switch | SST13S | 1 | ISO | | |
| SS17 | Power Switch | SSH13S | 1 | ISO | | |
| | **MISCELLANEOUS** | | | | | |
| PL1-3 | Pilot Lamp 11 V 0.3 A | XAM43T | 3 | | | |
| PL5 | Stereo Eye 3 V 40 mA | SVL301 | 1 | | | |
| | Fuse 0.5 A | SSF5011 | 1 | | | |
| | Fuse 1 A | RSF1021 | 1 | | | |
| | Fuse 1.5 A | XBAS1B1501 | 2 | Ⓝ | | |
| | Tuning Meter | SSM13 | 1 | | | |
| | AC Cord | SJA33 (SJA41) | 1 | | | |
| | Fuse Holder | SJF103-1 | 2 | | | |
| | 2 PIN Jack | SJF3201 | 3 | | | |
| | 4 PIN Jack | SJF3405 | 1 | | | |
| | Antenna Terminal | RJF4202 | 2 | | | |
| | Speaker Terminal | SJF4405S | 1 | ISO | | |
| | DIN Socket | SJS13-1 | 1 | | | |
| | Voltage Adjust socket | RJS7S | 1 | ISO | | |
| | Voltage Adjust Plug | RJP14 | 1 | | | |
| | Remoe Speaker Short Pin | SJP2117 | 2 | Ⓝ | | |

| Ref. No. | Description | Part No. | Per Set (Pcs.) | Remarks | Price | |
|---|---|---|---|---|---|---|
| | Dial Cord | RDZ07-1 | 60″ | | | |
| | Drum | RDD2080-1S | 1 | ISO | | |
| | Dial Spring | RDS417 | 1 | | | |
| | Tuning Shaft | SDT6251 | 1 | | | |
| | Slide Volume Knob | SBN229 | 4 | | | |
| | Selector Knob | SBN231 | 1 | | | |
| | Power Switch Knob | SBN241 | 1 | | | |
| | Tuning Knob | SBN227 | 1 | | | |
| | Dial Panel | SKD1371 | 1 | Ⓝ | | |
| | Smoked Plate | SDE51-1 | 1 | Ⓝ | | |
| | Name Plta | SGT3031 | 1 | Ⓝ | | |
| | Center Box Cabinet | SKA2931 | 1 | Ⓝ | | |
| | Player Cabinet | SKA3231 | 1 | Ⓝ | | |
| | Speaker Box Cabinet | SKA3232 | 2 | Ⓝ | | |
| | Dial Back Plate | SDH155 | 1 | | | |
| | Pointer Screen | SDE49 | 1 | | | |
| | Polyslider | SDE53 | 1 | | | |
| | Screen | SDH175-1 | 1 | | | |
| | Screen | SDH159 | 1 | | | |
| | Panel Rubber | SHG997 | 2 | | | |
| | Headphone Jack | SWJ5 | 1 | | | |
| | Headphone Jack Cover | SUV97-1 | 1 | | | |
| | Player Source Socket | SJS4301 | 1 | | | |
| | Phono 2 Short Pin Plug | SJP9103 | 2 | Ⓝ | | |
| | Leg (Center) | SHG327 | 4 | | | |
| | Leg (Player) | SHG327-1 | 4 | | | |
| | Dust Cover | SYE115-2 | 1 | | | |
| | Badge (Speaker) | SGB231-2 | 2 | | | |
| | Grill | SKZ185 | 2 | Ⓝ | | |
| | Net | SGS213 | 2 | | | |
| | Bottom Board (dlayer) | SKU2810 | 1 | Ⓝ | | |
| | Slider | SDA11 | 1 | | | |
| | Sub Slider | SDP1301 | 1 | | | |
| | 6½″ PM Dynamic Speaker (Woofer) | EAS16P68S | 2 | | | |
| | 2½″ PM Dynamic Speaker (Tweeter) | EAS5HH31SG | 2 | Ⓝ | | |
| | Panel | SGW3253 | 1 | Ⓝ | | |
| | Screw, Player Bottom Board | PSM3.1-13BL | 12 | | | |

| Ref. No. | Description | Part No. | Per Set (Pcs.) | Remarks | Price | |
|---|---|---|---|---|---|---|
| | Screw, Player Back Plate | XSB3+14FVS | 4 | ISO | | |
| | Screw, Speaker Cabinet | PSM3.1-20BL | 24 | | | |
| | Screw, Center Box Bottom Board | STR33-20BL | 5 | Ⓝ | | |
| | Screw, Voltage Adjust Plug | XSN3+16FVS | 1 | ISO | | |
| | Screw, 3 P Socket | STR3-8ZK | 2 | | | |
| | Screw, Toggle Switch | XSN3+53 | 9 | ISO | | |
| | Screw, Drum | PL3-5.5S | 2 | ISO | | |
| | Screw, Panel | XNG3BS | 4 | ISO | | |
| | **PACKING MATERIALS** | | | | | |
| | Outside Packing Case | SPG219 | 1 | Ⓝ | | |
| | Side Pad, Outside Packing Case | SPG221 | 4 | Ⓝ | | |
| | Packing Case, Center Cabinet | SPN2223-1 | 1 | Ⓝ | | |
| | Packing Case, Speaker Cabinet | SPN2235-1 | 1 | Ⓝ | | |
| | Top Pad, Speaker Cabinet | SPN2241 | 1 | Ⓝ | | |
| | Side Pad, Speaker Cabinet | SPN2237 | 4 | Ⓝ | | |
| | Bottom Pad, Speaker Cabinet | SPN2239 | 1 | Ⓝ | | |
| | Center, Pad, Speaker Cabinet | SPN2243 | 1 | Ⓝ | | |
| | Pad, Player Cabinet | SPN2225 | 2 | Ⓝ | | |
| | Lid Pad, Player | SPN2455 | 2 | Ⓝ | | |
| | Side Pad, Amp. | SPN2231 | 2 | Ⓝ | | |
| | Accessory Box | SPN2233 | 1 | Ⓝ | | |
| | Pad, Pickup | SPN1687 | 1 | | | |
| | Soft Cover, Center Unit | SPP129 | 1 | | | |
| | Soft Cover, Player Cabinet | SPP53-1 | 1 | Ⓝ | | |
| | Soft Cover, Speaker Cabinet | SPP173 | 2 | Ⓝ | | |
| | Poly Bag, Center Unit | SPPH7 | 1 | | | |
| | **ACCESSORIES** | | | | | |
| | Speaker Cord | SJP2109 | 2 | | | |
| | Printed Matter | SQF261-2 | 1 | Ⓝ | | |
| | Accessories Bag | SPB309-2 | 1 | Ⓝ | | |
| | EP Adaptor | EPS10 | 1 | | | |
| | Felt, Speaker Cabinet | SPB299-1 | 1 | Ⓝ | | |
| | Printed Matter, Speaker Cabinet | SQF267-2 | 1 | Ⓝ | | |
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